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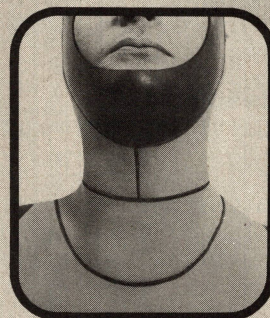


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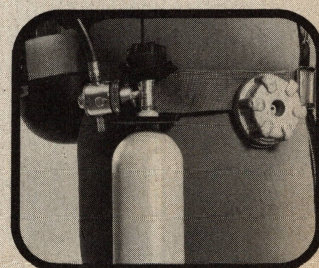
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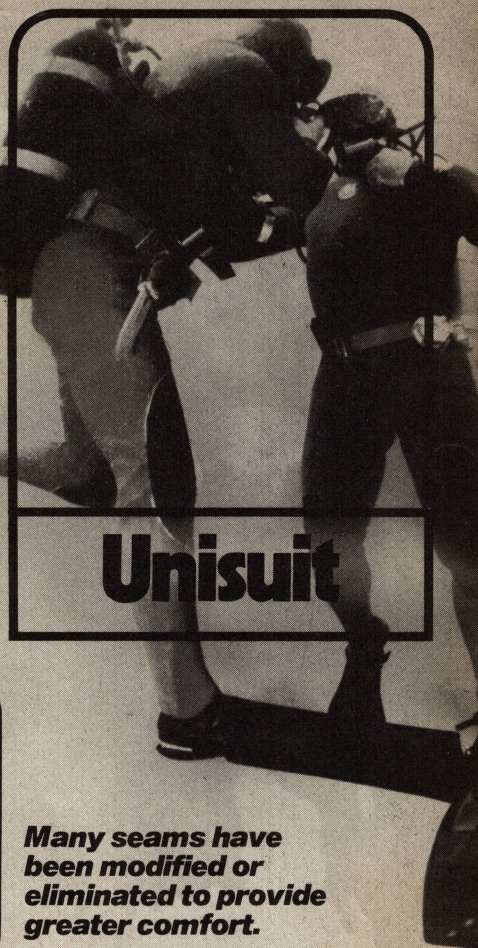
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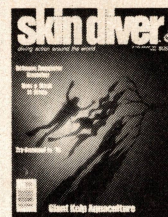


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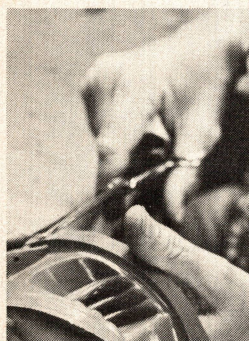
VOLUME TWENTY-FIVE NUMBER ONE



36/Sea Sower



52/Relic Rooter



40/Mask Maker

FEATURES

EQUIPMENT

- 12** OCTOPUS REGULATORS • NANCY ACKERMAN
Join the regulator revolution

- 40** HOW A MASK IS MADE • JACK MCKENNEY
Following the steps of the engineering and fabrication of a simple face mask

PHOTOGRAPHY

- 34** THE ABC'S OF UNDERWATER PHOTOGRAPHY • JIM AND CATHY CHURCH
About the camera

CALIFORNIA MARINE LIFE

- 36** GIANT KELP AQUACULTURE • CHUCK ALLEN
A look at the advances of giant kelp aquaculture techniques

DIVING ADVENTURE

- 44** UNDER THE TOP OF THE WORLD • DR. JOSEPH B. MACINNIS
Looking up at the North Pole

TRAVEL

- 52** BERMUDA'S RING OF WRECKS • PAUL TZIMOULIS
Mid-ocean mecca for wreck diving

- 56** COZUMEL FOR '76 • JACK MCKENNEY
Drift along with us through Palancar Canyon or over the edge of Santa Rosa Reef

DEPARTMENTS

- | | | |
|---------------|----------------------|-------------------|
| 6 DRIFTWOOD | 24 INSTRUCTION | 62 DIVE TOUR NEWS |
| 19 SCUBA EXAM | 32 CALENDAR | 68 NEWS BRIEFS |
| | 48 FISH OF THE MONTH | |

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Cover—Pat McKenney descends to a kelp forest between Anacapa and Santa Cruz Island off California. Jack McKenney took the photograph in 40 feet of water with a Nikonos camera and a 21mm lens.

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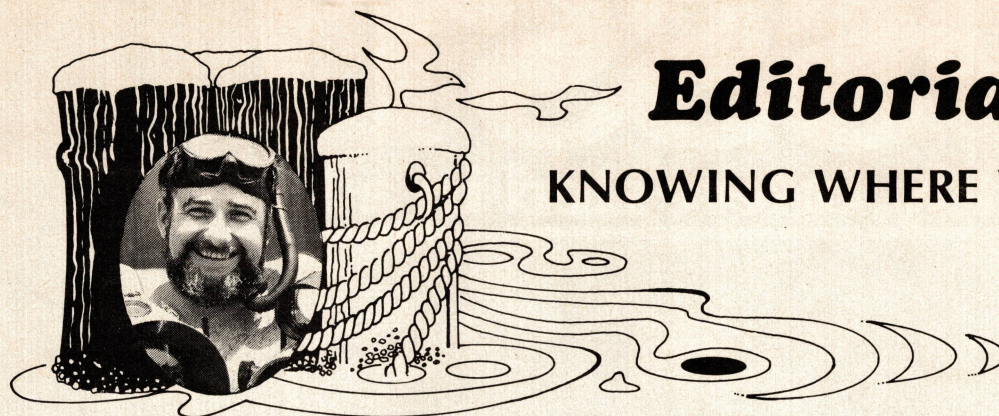
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Editorial

KNOWING WHERE YOU'RE AT

by the Publisher

If sport diving were to run a Most-Valuable-Instrument contest, the submersible tank pressure gauge would surely win first prize. No other instrument has done so much for the safety and pleasure of diving. It has virtually eliminated that gnawing fear of wondering when your air supply is going to run out, and it has saved many, many lives by preventing hazardous out-of-air situations. In this age of modern diving equipment technology it is virtually unthinkable for a trained/certified scuba diver to enter the water without a submersible pressure gauge — yet we see it being done almost every day. Why people continue to ignore the advantages of such a valuable lifesaving device is one of the mysteries of the human psyche.

The submersible tank pressure gauge is much more than just another expensive trinket hanging off your tank. It is the only instrument which can provide a visual picture of what's going on inside. If used correctly, this instrument can perform for you three vital functions which are important to your safety. First, it can confirm the fact that your tank is full before you start the dive. Second, it can indicate the exact pressure within your tank during the entire dive. Third, it can show your air consumption rate, as compared to your buddy or others in your dive group. All three readouts are easily accomplished and soon become second nature, like shifting gears while driving.

The pre-dive tank check can be your most important double-check. You naturally assume the tank is full, but how many times have you taken, or been given, an empty or half-empty tank for the second dive? It happens frequently on dive boats, especially when there's a large dive group and everyone is in a rush. Empties can easily be shuffled in with the full tanks, and mix-ups do happen when the compressor operator is rushed. Air can seep out of a slightly opened tank valve and go unnoticed if the ship's engine is running. Such slip ups are common, and the experienced diver tries to anticipate these errors.

The submersible tank pressure gauge makes it easy to double-check. The min-

ute you hook up the regulator and turn on the tank valve, you've got an instant reading. There's no chance for a tank mixup. What you read on the gauge is what you've got in the tank.

Constant monitoring of your tank pressure throughout the dive is the most obvious advantage of the submersible gauge. It not only makes diving easier and safer — it makes diving far more precise. For years, scuba students were taught complicated mathematical formulas for computing their air consumption and estimated duration of the tank being used. In the classroom, these theoretical equations worked fine, but underwater they were a dismal failure.

There are two basic flaws with the textbook formulas. First, most sport divers follow a multi-level dive profile, following the contours of the reef, wreck, or sloping bottom. Air consumption rate is constantly changing as the diver moves from one depth to another. To compound the problem further, we have the second variable — the sport diver's fluctuations in breathing rate. When a diver is lying or hanging motionless to take a macro photograph, the breathing rate is minimal. When the same diver is frantically chasing an eagle ray in a breathless attempt to snap its picture, the breathing rate is five or six fold. Attempting to compute the correct air consumption during such maneuvers would be enough to keep even Einstein busy. Besides — who carries that much paper and pencils underwater?

The submersible pressure gauge is the only accurate and sure way of knowing how much air supply is left in your tank. It tells you when to turn around and start heading back to shore or the boat. It tells you when you are nearing the end of your supply and when to start for the surface. It's more than just a pressure gauge — it's a dive planner.

The post-dive check of your submersible gauge is just as important as its use underwater, for it can tell you something which is revealed in no other way — comparative air consumption. It is not uncommon for two divers making the exact same dive profile to return to the

boat — one with an empty tank and the other with 1200 psi still remaining. Obviously one diver is a "fast breather" and the other is a "slow breather" — and it is important to be aware of this factor.

Breathing rates and air consumption among sports divers is often extremely varied. In fact, so much that it could prove dangerous if the two divers did not realize the vast difference in their air consumption rates. The "slow breather" could be still heading down the slope of the reef, as his "fast breather" buddy is about to run out of air. It happens.

By comparing the remaining tank pressures after the dive, each diver learns what his individual air consumption is, and how it compares to the others in the group. A diver should not be ashamed or embarrassed at being a "fast breather", but it is stupid to try to hide the fact. Quite often "fast breathers" or exceptionally "slow breathers" can be paired up for a more compatible buddy arrangement.

The diving equipment manufacturers in the U.S. have certainly made it easy for every diver to obtain and use a submersible gauge. All single hose regulators presently on the market have a high pressure port for installing such a gauge. These regulator ports and the gauge hose fittings have all been standardized so that they are interchangeable. Any American submersible gauge will fit onto any American made regulator. All but one American regulator manufacturer now produce submersible gauges, and they are available in a wide variety of styles, shapes, and designs. It is doubtful that there is a dive shop in the country which doesn't carry such gauges as part of their regular inventory.

Considering the advantages, it is difficult to think of a single reason why the submersible tank pressure gauge isn't used by every diver who dips his flippers into the water. In fact, there's no reason why every sport diver doesn't buy a submersible gauge right along with his regulator purchase. Better yet, there's no reason why the dive shop salesman shouldn't sell a submersible gauge along with every regulator. 

skin diver

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... While patrolling the beach at Cape Hatteras National Seashore shortly after Hurricane Gladys, I came upon the underwater light shown in the enclosed photograph.



It is an Ikelite 400. It must have been in the water a long time because it was heavily encrusted with barnacles and other marine growth. The letters "R.M." are etched on the back, and the last name is embossed on tape attached to the housing.

Perhaps one of your readers can identify it and help us solve one of the mysteries of the Graveyard of the Atlantic. We will be happy to return it to its owner. Just let us know the last name, and where and when it was lost.

By the way, the light still works ...
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... Quite coincidentally your October 1975 issue crossed my desk within days of the arrival of a new book titled *The Biology of Sea Snakes* (ed. Dr. W. A. Dunson, 1975, University Park Press, Baltimore, Md.). In light of your cover photo and the article by the Taylors, I decided to compare some of the facts and opinions from the article with those in the book. I think your readers might be interested.

Ms. Taylor says, "So far, about eight species from the family Hydrophidae have been found in Australian waters."

Dr. Harold G. Cogger, Curator of Reptiles, the Australian Museum, Sydney, Australia, writes in Chapter 4 of the *Biology of Sea Snakes*, "The seas of tropical Australia support a rich sea snake fauna, with a strong endemic component and with a greater species diversity than any other region. Some 32 species (out of a world total of approximately 55 species) are currently recorded from this region, of which near 50% are endemic."

Ms. Taylor suggests that a sea snake "twined lovingly around your leg" is no cause for worry.

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In Chapter 17, Dr. H. Alistair Reid, O.B.E., School of Tropical Medicine, Liverpool, England, cites a nonfatal case of sea snake bite where the victim "felt the snake coiling around his forearm and biting his hand."

Ms. Taylor directs anyone pestered by a sea snake to "take him gently around the neck and tenderly carry him over to your buddy."

Dr. Reid points out that, "My own observations of sea snakes in captivity in Malaya indicated marked differences in behavior in different species. Thus *E. schistosa* is much more aggressive than any other species I have observed." Reid refers to an older work which states that *E. schistosa* in Indian waters is "very ferocious both in and out of the water."

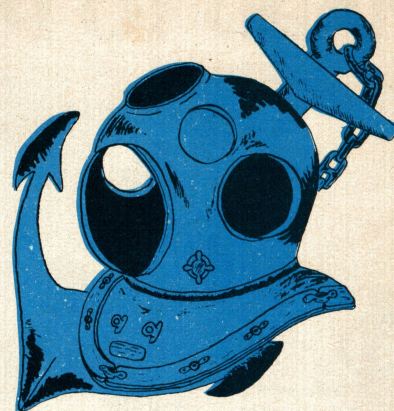
Dr. Cogger documents the occurrence of *E. schistosa* in the waters of Northern Australia while Dr. Reid comments that *E. schistosa* is the most "common known sea snake," and according to Dr. Malcolm Smith in 1926 the species is quite abundant in Australian waters.

Chapter 22, by Dr. Harold F. Heatwole, Associate Professor of Zoology, University of New England, Armidale, Australia, deals specifically with attacks on divers. I will only mention briefly a few points. Sea snake aggressiveness not only varies from species to species but from season to season. Unprovoked attacks are apparently much more likely during the breeding season of some species. An attacking sea snake is very likely to be persistent. They are not typically diverted or distracted and leaving the water to stop an attack with any degree of certainty. A wet suit will stop most sea snake fangs. They are not long enough to pierce the material, but *Astrotia stokesii* (found in Australian waters) does have fangs of great enough length to penetrate a wet suit. Also very large individuals of other species may be able to bite through wet suit material.

To date only one commercially made sea snake antivenin is available. It is specifically for the bite of *E. schistosa*. The only lab producing the antivenin is in Melbourne, Australia.

My reason for writing is not to spread alarm among the diving enthusiasts of the world. I would sound a note of reason, however. True, most sea snakes are not aggressive, but how does the inexperienced person recognize unaggressive species or individuals? It seems unreasonable to me to risk the possible consequences by handling unidentified sea snakes either in or out of the water. JAMES BACON, PH.D. ZOOLOGICAL SOCIETY CURATOR OF REPTILES OF SAN DIEGO

Granted, Valerie Taylor's article in the October 1975 SDM was written in a very light vein. It was hoped that while she wrote of these interesting marine reptiles in such manner, SDM readers would keep in mind that, as she stated so well in



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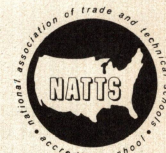
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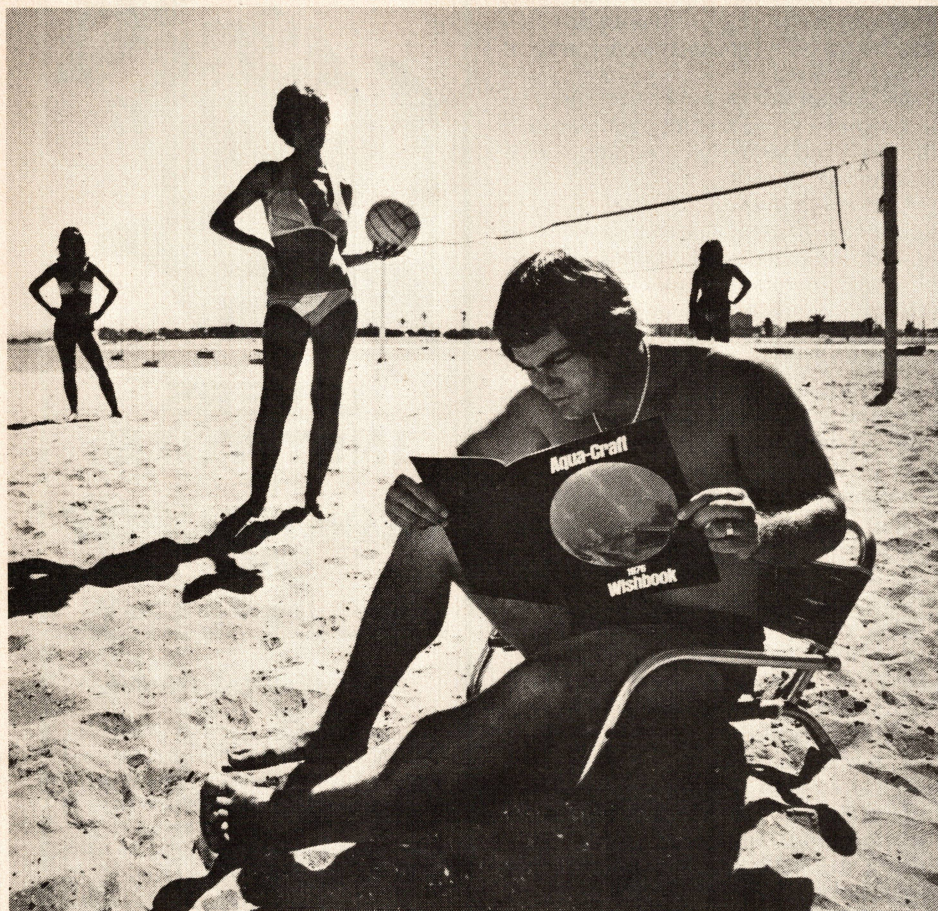


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her third paragraph, "Their venom is, drop by drop, ten times more potent than that of their cousin the cobra . . ."

Another problem with publishing any information on marine biology, whether it be on sea snakes or marine fishes, is that available information on any one subject may change radically from day to day, from expert to expert. We hope here at SKIN DIVER to publish the most recent and most accurate information available at any given time. We appreciate your notifying us of any new publications that are related to underwater topics.

. . . I am a member of the Divers Division of the Pima County Search and Rescue Squad. We are in need of some information. It has been brought to our attention that sometime between 1969 and 1971 several members of a diving club from Washington State spent their summer vacation mapping the underwater topography of Peppersauce Canyon, in the Catalina Mountain Range, which is in Pinal County, Arizona.

We have tried, without success, to locate the individuals who were involved in mapping this area. Although this area is not our direct responsibility we are often called into other counties to conduct or assist in underwater search and recovery operations. Since cave diving is not our particular specialty, the maps of this cave would be of untold value to us. Attempting to locate these individuals and their maps through your magazine seems to be our only hope.

Anyone with any information, please contact: Mr. Edward Ryan, 3720 S. Lundy Ave., Tucson, Arizona 85713. CHAS. EVERETT, JR. TUCSON, ARIZONA

. . . Most divers, novice and expert, and most dive clubs are always looking for new reasons for going diving . . .

The Ka Imi Kai ("Searchers of the Deep") Club of Honolulu, Hawaii, of which I am a member, schedules one to two "lead dives" every year. During these dives, the participants try to find as much lead, in the form of fishing sinkers, as they can. The collected lead, usually about two hundred pounds for the two dives, is heated and formed into diving weights at our annual Lead and Shirt Party. The formed weights are then sold, normally to club members, at below retail cost. The proceeds, naturally, go to the club coffer. The shirt part of the party refers to the fact that, on the same night, members can have the club emblem silk-screened onto any garment. The charges for the screening, again, enriches the club's treasury.

STEPHEN KENNEDY HONOLULU, HI.

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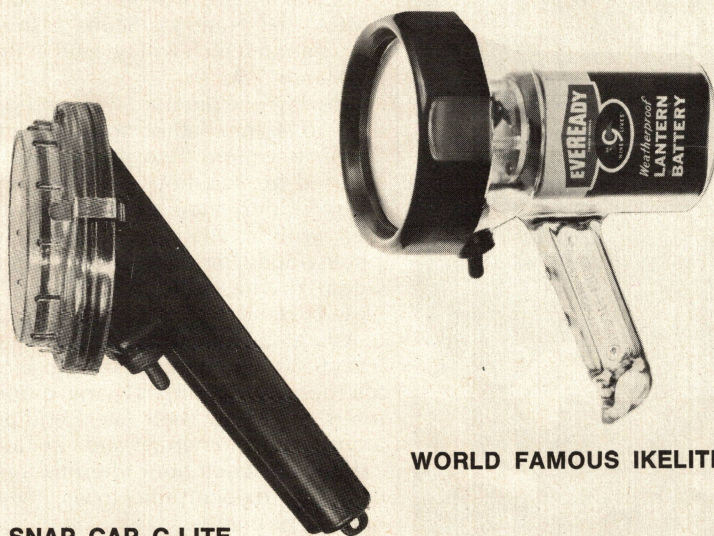


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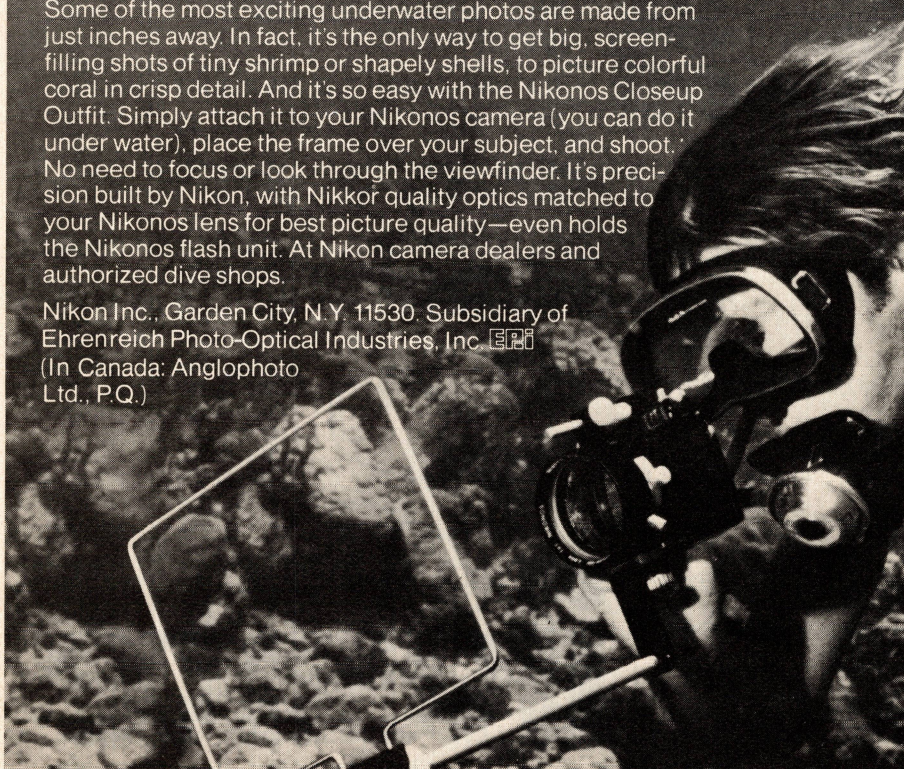
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BOSTON SEA ROVERS '76



The next edition of the oldest established underwater show in the world, the 1976 Boston Sea Rovers' Underwater Clinic, will be held March 6, 1976, at Boston University, John Hancock Hall.

This year's Clinic will feature the newest information on underwater technology, photography, New England archaeology, etc.; displays of diving equipment; and underwater entertainment never before seen in New England. A special feature of Sea Rovers '76 is the YMCA 2nd National Scuba Instructors Convention which will be held in Boston on March 5-7.

The daytime program will run from 10 a.m. to 4 p.m. at Boston University's Sherman Union. Two auditoriums will be used for half hour presentations on many underwater subjects. Featured areas will include marine biology, diver photography, new technology in professional diving, saturation diving, and New England marine archaeology.

A large area of displays will be open from 9:30 a.m. till after the close of the afternoon programs. Diving manufacturers will show their latest equipment along with commercial and educational exhibits. A lunch hour intermission will be an added opportunity to visit the large number of booths.

The evening program at John Hancock Hall has long been famous as the showcase of the newest and best in underwater entertainment for divers and non-divers alike. This year will be no exception: the show starts at 8 p.m. The Meet-the-Speakers Party will be held at the John Hancock's Dorothy Quincy Suite after the evening program.

Save that special Saturday, March 6, 1976 for Sea Rovers '76 in Boston. It should be one of the best yet! 

How good should safe be?

This year, thousands of new recreational divers will receive basic certification.

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Sure, that's more than others may require. But it makes sense, because SSI wants divers to be skilled and comfortable with their ability when training is completed . . . or they don't get a card.

So from now on, anyone willing to settle for less will just have to go somewhere else.



SCUBA SCHOOLS INTERNATIONAL 1634 S. College Ave. Ft. Collins, CO 80521 (303) 482-0883

OCTOPUS REGULATORS

By Nancy Ackerman

The octopus regulator has revolutionized buddy breathing. Instead of two divers exchanging one mouthpiece in order to share one air supply, there are two second stages.

The octopus regulator came into being in about 1965. Physically, the octopus is two regulator second stages connected to one regulator first stage. This second, second stage came about when manufacturers began adding extra low pressure ports on the regulator's first stage. The addition of these extra ports, initially, was for pneumatic underwater tools.

Generally, the octopus is used as a safety device in an emergency when a diver has run out of air and needs to breathe before reaching the surface. The octopus is used in salvage operations, deep diving, decompression diving, cave and wreck diving, diver training, and by dive guides. A highly dangerous and stressful situation can be enormously relaxed when both the diver who has run out of air and the assisting diver each have a regulator in their mouths.

Ideally, an octopus assist situation would have two prepared divers who have discussed the possibility of such a situation before diving together. A diver who has run out of air needs not only to know that his buddy has an octopus; but also where this octopus is going to be, and how he can get hold of it to use it. Preparations and proper training for an emergency such as an octopus assist can result in almost automatic, correct reactions from both divers.

Along with the development of the octopus regulator, a few improvements have evolved. The standard regulator hose is usually about 24 inches long; the modern octopus hose should

be at least ten inches longer. This extra length makes utilization of the octopus easier — divers can comfortably face each other during ascent or swim side by side, using the octopus.

Many octopus regulators are now color-coded. A few manufacturers have made the purge valves on the two second stages different colors; some manufacturers have added tape to the hose of the octopus to differentiate the two hoses.

A custom lefthanded second stage has also been developed. It is a second stage constructed with an extra long hose and feeds from the low pressure port and over the diver's left shoulder. Swivel tees, too, facilitate octopus assist by allowing more mobility between divers.

Placement of the octopus has always been a problem. You can't let it drag in the sand or the silt; don't let it become snagged on protrusions. Observations have it that some tuck it under the tank harness, in a buoyancy compensator pocket, or keep it intact and available by using a velcro loop. Many instructors have suggested that manufacturers come up with a breakaway attachment to fit on a back pack that would keep the octopus both available and handy.

The octopus is becoming more and more recognized as a superior method for assisting a diving buddy who is experiencing an out-of-air emergency. For the price, it is perhaps the best investment in diver safety.

The following is an alphabetical listing of the regulator manufacturers who all make octopus regulators, plus the statistics for their respective second stages. Look them over carefully — shouldn't you have one, too?

AGA CORPORATION

Octopus Model: Breathing valve w/mouthpiece and octopus hose

Length of Octopus Hose: 43 inches

Identification Coding: none

Price of Octopus: \$121

Regulator Model: Regulator Unit

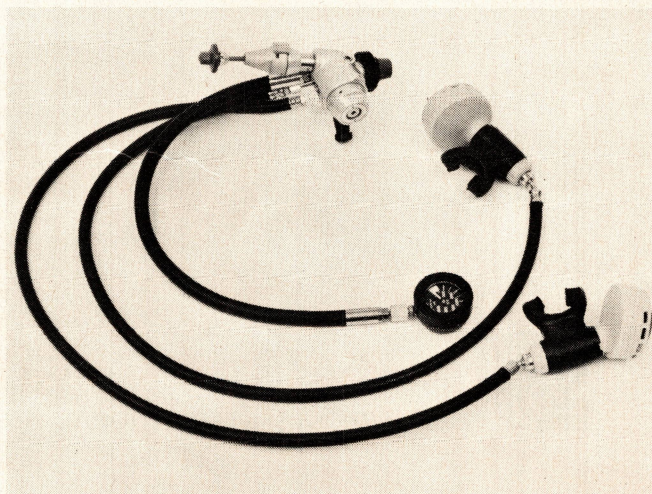
Length of Hose: 43 inches

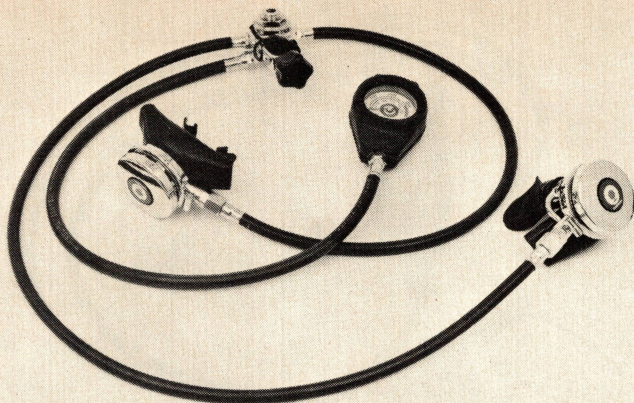
Price of Unit: \$225

Model Pressure Gauge: part of Regulator Unit.

The AGA Divator regulator unit can be adapted to fit standard U.S. aluminum and 72 cf scuba tanks. Second stage regulator is usable with the Divator Full Face Mask.

AGA Corporation, 1163 Chess Drive, Foster City, California 94404.





AMF SWIMASTER

Octopus Model: MR12 II Octopus

Length of Octopus Hose: 36 inches

Identification Coding: none

Price of Octopus: \$64

Regulator model: MR12 II

Length of Hose: 24 inches

Price: \$155

Model Pressure Gauge: DS111

Price: \$50

Octopus works best with Swimaster regulators, needing 120-135 psi or intermediate pressure port. Case is chrome-plated brass; other materials polyurethane and neoprene.

AMF Swimaster, 3801 South Harbor Blvd., Santa Ana, California 92704.

DACOR CORPORATION

Octopus Model: Olympic 2ST

Length of Octopus Hose: 39 inches

Identification Coding: yellow tape around octopus

Price of Octopus: \$65

Regulator Model: Olympic 400

Length of Hose: 24 inches

Price: \$125

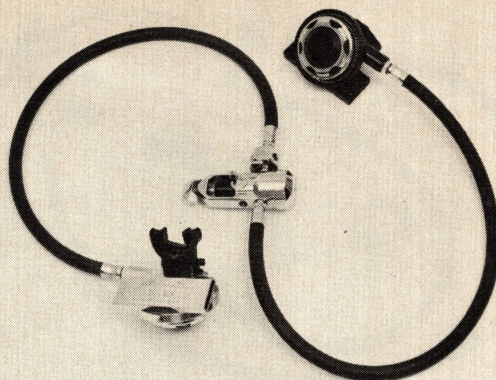
Model Pressure Gauge: TAG

Price of Gauge: \$40

Price of 400-2 regulator with second stage: \$185

The balanced first stage accommodates the Octopus Adapter to allow extra second stage to come over right or left shoulder. Features Anti-Free Flow System.

Dacor Corporation, 161 Northfield Road, Northfield, Illinois 60093.



AIRMATIC

Octopus Model: Airmatic octopus system

Length of Octopus Hose: 29 inches

Price of Octopus: available on request

Regulator Model: Aquastar® Airmatic

Length of Hose: 29 inches

Price of Unit: available on request

The European-made Airmatic octopus system has a high pressure port in the first stage usable with American accessories, as is the low pressure port on the swivel adapter. The second stage with the chrome body is designed to come across the diver's left shoulder; the octopus second stage is designed to come from over the diver's right side.

Airmatic, % Undersea Systems, Inc., 112 W. Main St., Bay Shore, N.Y. 11706.

HEALTHWAYS

Octopus Model: Scubair II Octopus

Length of Octopus Hose: 34 inches

Identification Coding: none

Price of Octopus: \$61.71

Regulator Model: Scubair II

Length of Hose: 24 inches

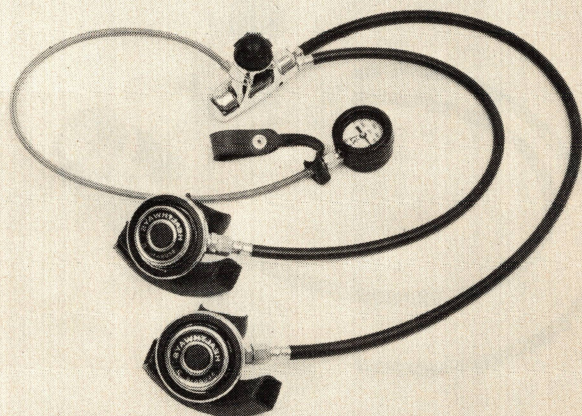
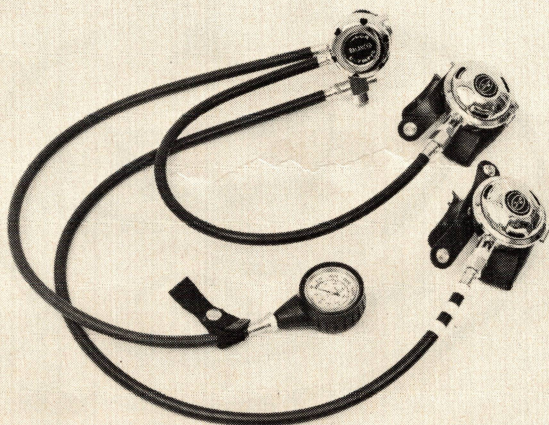
Price: \$129

Model Pressure Gauge: #1629 Depth Gauge

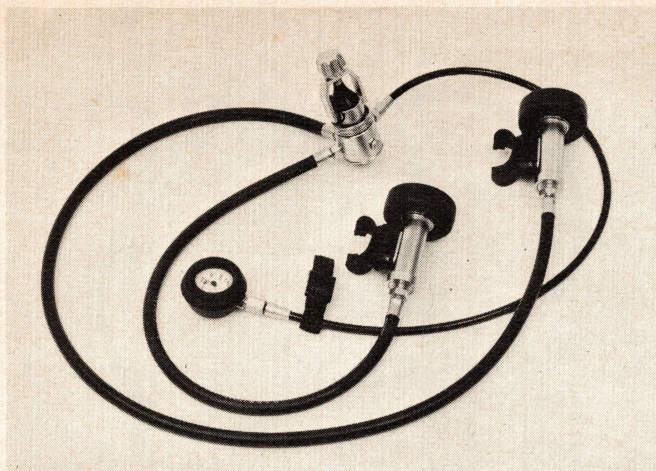
Price: \$50

Model 1677 Scubair II features balanced piston design, the second stage coming off one of the three intermediate pressure ports.

Healthways, 5340 W. 102nd St., Los Angeles, Ca. 90045.



photography by PPC staff photographer Larry Griffin



POSEIDON SYSTEMS U.S.A.

Octopus Model: 3204 Octopus 300

Length of Octopus Hose: 46 inches

Identification Coding: none

Price of Octopus: \$95

Regulator Model: Cyklon 300

Length of Hose: 25 inches

Price: \$149.95

Model Pressure Gauge: 7324 Sea View Gauge

Price of Gauge: \$48

Regulator features 4500 psi input capability, anti-freeze protection, adaptability to tanks worldwide, unique exhaust system.

Poseidon Systems U.S.A., 291 New Brunswick Avenue, Perth Amboy, New Jersey 08861.

SHERWOOD SELPAC

Octopus Model: Sherwood SRB-3007

Length of Hose: 25 inches

Identification Coding: none

Price of Octopus: \$55

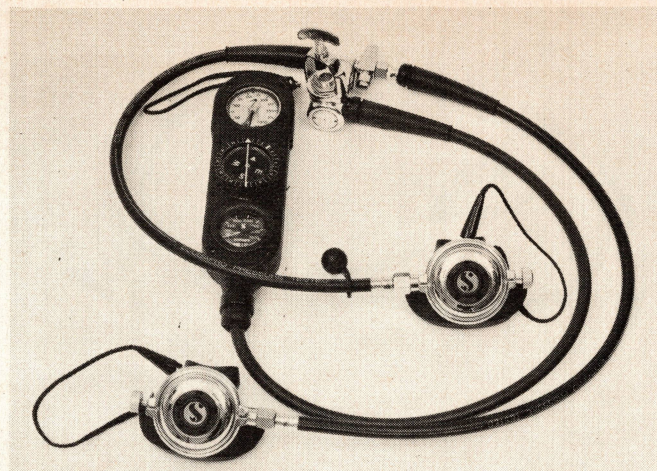
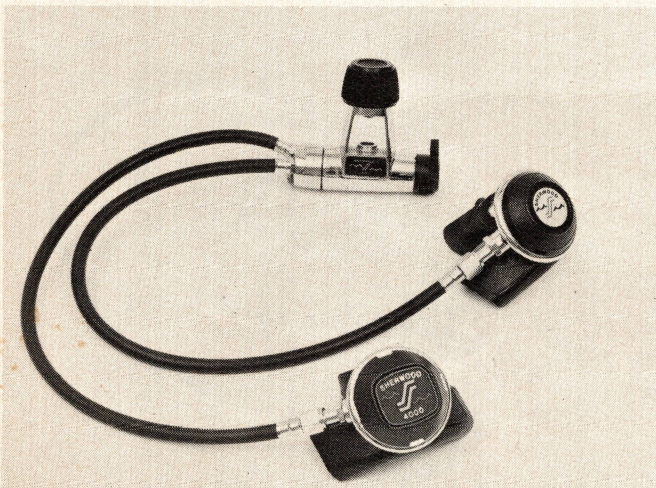
Regulator Model: Sherwood SRB 4100J

Length of Hose: 25 inches

Price of Regulator: \$145

The balanced piston, stainless steel first stage has the octopus coming off one of the four low pressure ports. Both the first and second stages are adjustable. The second stage features the Venturi, airfoil assist design, enlarged exhaust tee with chin support.

Sherwood Selpac, 120 Church St., Lockport, New York 14094.



SCUBAPRO

Octopus Model: #129 Custom Octopus Second Stage

Length of Octopus Hose: 30 inches

Identification Coding: none

Regulator Model: #105 Mark V Balanced Regulator

Length of Hose: 25 inches

Model Pressure Gauge: #132 Submersible Tank Pressure Gauge (within shown console unit)

Prices: Available on request from Scubapro

This second stage was constructed specifically for regulator octopus systems. It feeds from the low pressure port over the diver's left shoulder. Complete adjustable second stage coming from the Mark V stainless steel balanced piston first stage.

Scubapro, 3105 E. Harcourt St., Compton, Ca. 90211.

SPORTSWAYS

Octopus Model: 911-0 Octopus Second Stage

Length of Octopus Hose: 35 inches

Identification Coding: Octopus written on purge

Price of Octopus: \$64

Regulator Model: W-200 Waterlung Regulator

Length of Hose: 24 inches

Price of Regulator: \$135

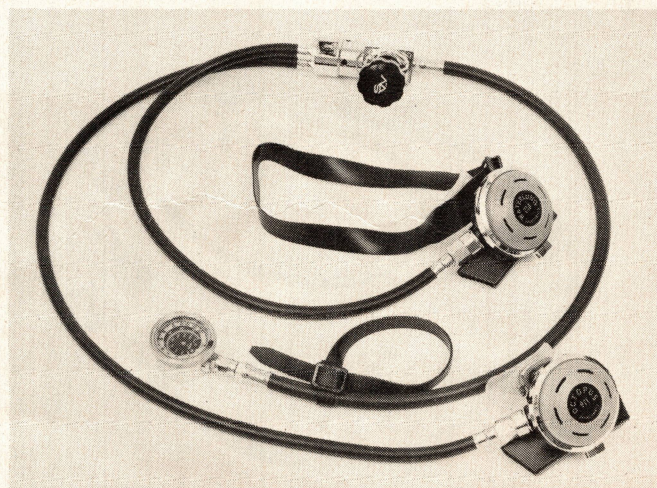
Model Pressure Gauge: 1401M Sea View Gauge

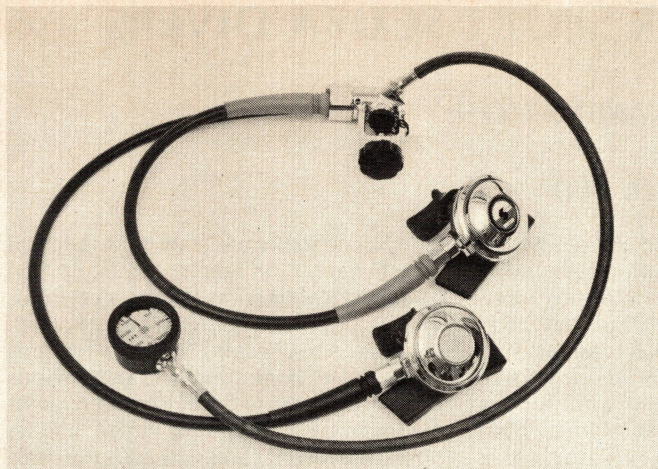
Price of Gauge: \$58.50

Price of the entire W-200-0 Unit as shown: \$199

The Waterlung piston first stage has the auxiliary second stage coming off one of the low pressure ports.

Sportsways, 2050 Laura Avenue, Huntington Park, Ca. 90255.



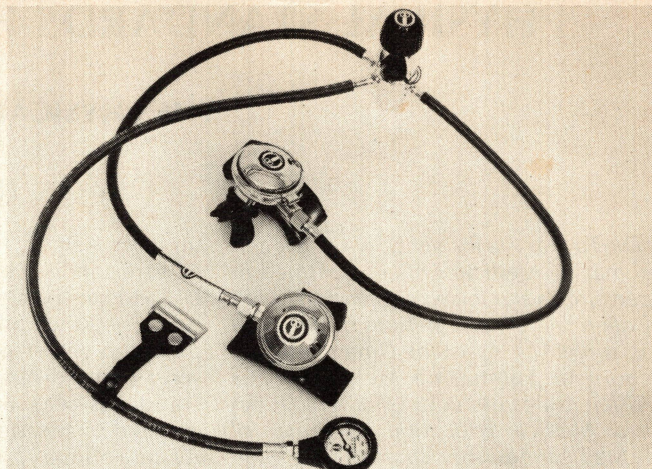
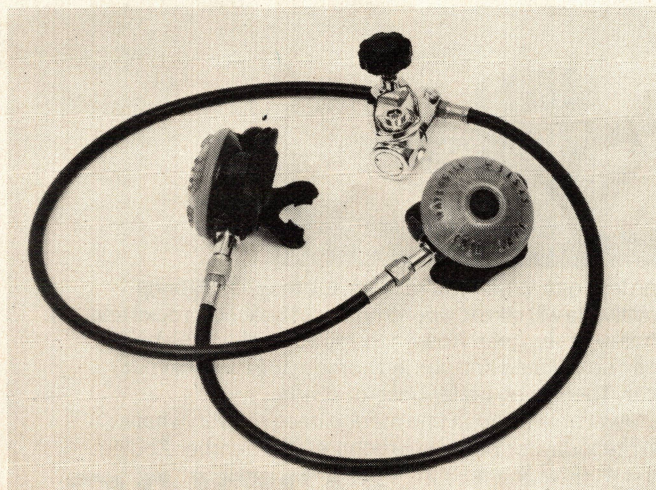


SUB-AQUATICS SYSTEMS

Octopus Model: 2003-0 Octopus
 Length of Hose: 32 inches
 Identification Coding: Orange purge, octopus housing
 Price of Octopus: \$56.25
 Regulator Model: 2096 Sub-II Regulator
 Length of Hose: 25 inches
 Price of Regulator: \$98.75
 Model Pressure Gauge: 2068 Sub View Gauge
 Price of Gauge: \$36
 Octopus comes off one of three low pressure ports from regulator's balanced piston first stage. Regulators feature cyclolac housing, life parts/labor warranty.
 Sub-Aquatics Systems, 530 Sixth St., Hermosa Beach, California 90254.

WATERGILL INC.

Model of Octopus: Watergill Fail Safe System Octopus
 Length of Hose: 31 inches
 Identification Coding: none
 Price of Octopus: \$55
 Regulator Model: Watergill Fail Safe System Regulator
 Length of Hose: 31 inches
 Price of Regulator: \$125
 Second stages have left or right hand capabilities, possibility installation communication system. Hose comes in 28, 30 and 33 inch lengths. Second stages come off one of four low pressure ports on the balanced piston first stage.
 Watergill, Inc., 18030 Euclid, Fountain Valley, Calif. 92708.

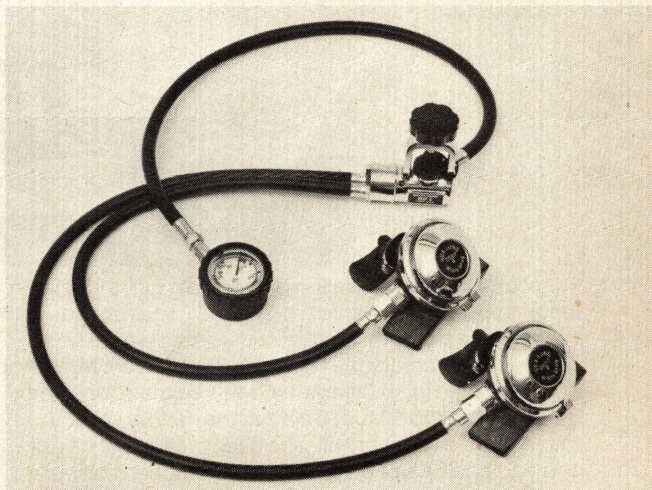


U.S.DIVERS CO.

Octopus Model: 1099-00 Octopus
 Length of Hose: 25 inches
 Identification Coding: yellow tape
 Price of Octopus: \$59.75
 Regulator Model: 1086-00 Aqua-Lung Aquarius
 Length of Hose: 25 inches
 Price of Regulator: \$76.50
 Model Pressure Gauge: 7036-00 Pro Dive I
 Price of Gauge: \$44.50
 The second stage comes off one of two low pressure ports from the piston first stage. The second stages feature oversized exhaust tees made of silicone, large purge buttons, Venturi air flow action.
 U.S. Divers, 3323 W. Warner Ave., Santa Ana, Ca. 92702.

WHITE STAG

Model Octopus: Sea Lung Deep II Octopus
 Length of Hose: 34 inches
 Identification Coding: none
 Price of Octopus: \$50
 Model Regulator: Sea Lung Deep II Regulator
 Length of Hose: 25 inches
 Price of Regulator: \$120
 Model Gauge: 51215 Pressure/Depth Gauge
 Price of Gauge: \$45
 Octopus comes off one of three low pressure ports on the balanced piston, stainless steel first stage. Lexon® second stage housing, one owner, lifetime warranty on parts and workmanship. Swivel tee available.
 White Stag Water Sports Division, 1046 Princeton Drive, Marina del Rey, Ca. 90291.



PHYSICAL STANDARDS FOR SPORT SCUBA DIVERS

THE PHYSICAL EXAMINATION

BY E. S. TUCKER, M.D.

Dr. Tucker is a former USN Diving and Submarine Medical Officer qualified in open circuit and mixed gas scuba, as well as deep sea air and helium diving, and has served as Assistant Director of the School of Submarine Medicine. His civilian duties include: UNEXSO Director of Medical Education, Chairman of the Medical Advisory Board of Dive-Med International, NAUI certified instructor, and Chief Resident in Neurology at Yale School of Medicine.

Unlike driving and flying, scuba diving has no standardized procedures for the medical examination of candidates. Yet, the inherent risks from hyperbaric pressure put diving in a category separate from other physically demanding sports, such as tennis, swimming, or skiing.

During four years of diving medicine training programs held at the Underwater Explorer's Society headquarters in Freeport, in which some 180 civilian physicians participated, a rational set of standards has emerged. In 1973, the UNEXSO Diving Medicine staff, consist-

ing of myself, S. Harold Reuter, M. D., Edward Landis, M. D., John Clement, M. D., and our prime mover in this direction, Eric Kindwall, M. D., formalized a proposed set of physical standards for sport scuba divers. This set of physical standards was adopted and recommended by the Undersea Medical Society in February, 1974. This article is drawn from those standards, as well as from responses from class members to opinion questions on the diving medicine final examination.

The ideal examination would be a one-stop procedure, consuming little time, and costing \$20 or less. Unfortunately, I can conceive of no way of satisfying those requirements. At this time, a combination examination consisting of a general physical and a set of chest x-rays is the minimum that most diving physicians consider acceptable. Unless a diver candidate is fortunate enough to encounter a diving physician who is also a specialist in radiology, two separate appointments, costing \$20, or more, are necessary. The x-rays considered mini-

mally acceptable are a set of inspiration (breath held, x-ray taken), and expiration (breath released, x-ray taken) chest films. The expiration film is necessary because, in addition to checking the usual features of heart size, bone structure, and obvious lung lesions, the radiologist must look for evidence of air trapping which predisposes the diver candidate to error embolism. When the radiologist compares the two x-rays, air trapping may become apparent. If air trapping is suspected, then other more expensive procedures, such as pulmonary function testing, or lung scanning, may be needed. Other findings on x-ray, such as large glands obstructing the flow of air, or other structural defects, also make the physician suspicious of air trapping.

During the general physical examination of the diver, the following areas deserve special attention:

Ear, Nose, and Throat — Next to the lungs, the ear, nose, and throat system is probably the most important since most cases of hyperbaric trauma occur here. A

(Continued on Page 20)

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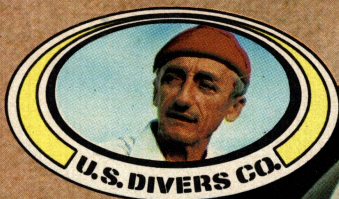
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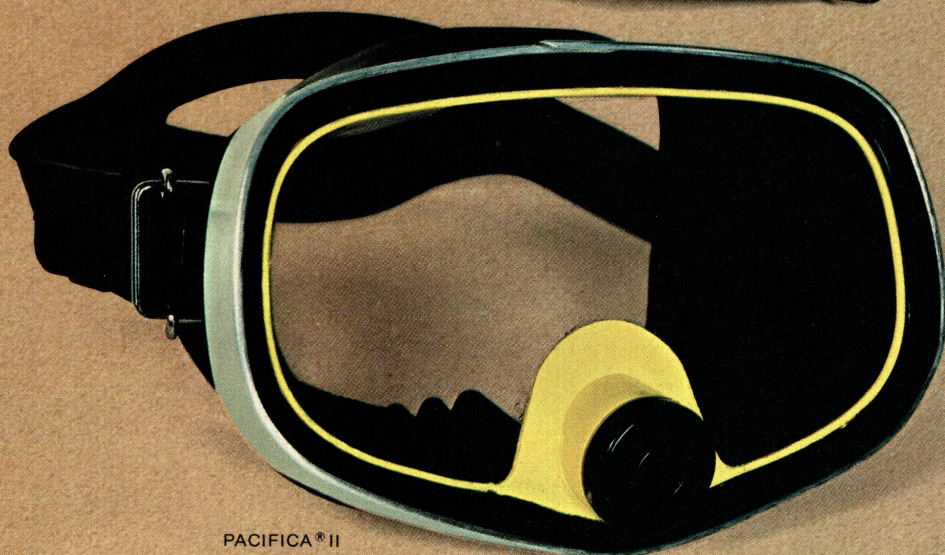
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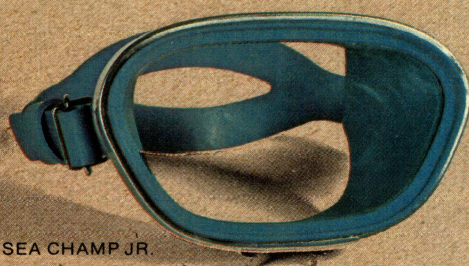
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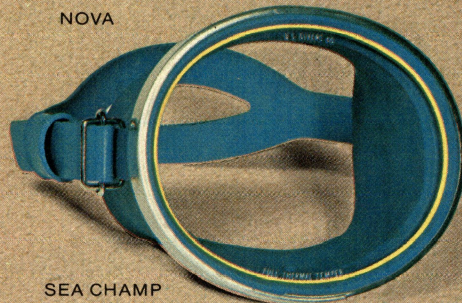
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Scuba I.Q. Test Your Dive Knowledge

What's Your Ice Diving I.Q.?

Ice diving requires special preparation, equipment, techniques and attitude adjustments on the part of all divers. Some practices for ice diving are broadly accepted, while others differ regionally. Seek a formal orientation to ice diving in your area. You can test your knowledge of some standard ice diving practices by answering the following questions. Answers are on page 30.

1) Ice diving can be safely enjoyed by anyone:

- ☐ A. In good health and a certified diver.
- ☐ B. In good health and possessing advanced training in ice diving techniques.
- ☐ C. Under 40 years of age with 50 logged cold water dives.

2) Ice diving can begin in most inland lakes:

- ☐ A. When the ice is a minimum of five inches thick.
- ☐ B. When the temperature has been below freezing for 30 days.
- ☐ C. When the "Danger Thin Ice" signs have been removed.

3) When choosing the ice diving site, the diver must:

- ☐ A. Consider the size and shape of the lake.
- ☐ B. Be careful not to choose a snowmobile trail.
- ☐ C. Utilize prior knowledge of the intended site.

4) The minimum number of participants for an ice dive is:

- ☐ A. Four
- ☐ B. Six
- ☐ C. Eight

5) The correct way to fasten a safety line to an ice diver is:

- ☐ A. Around the right wrist.
- ☐ B. Around the diver's waist and under the equipment.
- ☐ C. Tied to the scuba harness.

6) Cold weather requires equipment modifications including:

- ☐ A. Oiling metal buckles and tank valves.
- ☐ B. Adding extra layers of cement to seams to prevent splits and tears.
- ☐ C. Converting plastic straps to velcro, neoprene or webbing.

7) Minimum recommended exposure suit for ice diving includes:

- ☐ A. 1/4 inch wet suit, gloves, hood and boots.
- ☐ B. 1/4 inch farmer john wet suit, mitts, hood and boots.
- ☐ C. A dry suit with long underwear.

8) Single hose regulators may be used in place of double hose regulators while ice diving if:

- ☐ A. Care is taken to avoid exhaling through the regulator before going underwater.
- ☐ B. The regulator is kept in a warm place until the last minute.
- ☐ C. An octopus rig is used.

9) Line signals must be:

- ☐ A. Prearranged and simple.
- ☐ B. In accord with the National Standard.
- ☐ C. Answered first by the line tender in case of an emergency.

10) The spoke-like pattern sometimes shoveled in the snow around a dive site is useful for:

- ☐ A. Good hole management and surface organization.
- ☐ B. Increased light penetration and a relative sense of direction.
- ☐ C. Identification of the dive site by air crews in emergencies.

11) Safety lines:

- ☐ A. Should be attached to the diver's waist or harness at all times.
- ☐ B. Should be colored for better visibility.
- ☐ C. Should be warmed before the dive to prevent knots.

12) Effective safety divers must:

- ☐ A. Always be the most experienced divers in the group.
- ☐ B. Be completely geared up at all times.
- ☐ C. Be used whenever a diver fails to answer a line signal.

13) Safety lines for the divers generally do not exceed:

- ☐ A. 50 feet.
- ☐ B. 100 feet.
- ☐ C. 150 feet.

14) At the surface the loose end of the diver's safety line should be:

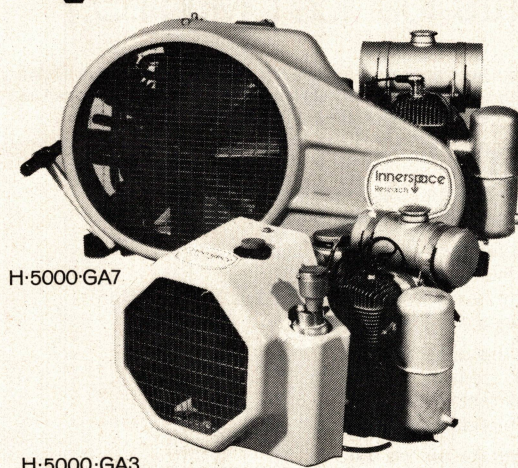
- ☐ A. Tied to a reliable automobile bumper.
- ☐ B. Tied to a long ice fishing chisel and hammered into the ice.
- ☐ C. Tied to the safety diver's waist.

15) If you should become separated from the safety line while diving under the ice, the correct action to take is to:

- ☐ A. Ascend to the ice and remain stationary.
- ☐ B. Use your compass to set up a search pattern to find the hole.
- ☐ C. Ascend to the ice and swim in ever-widening circles to locate the hole.

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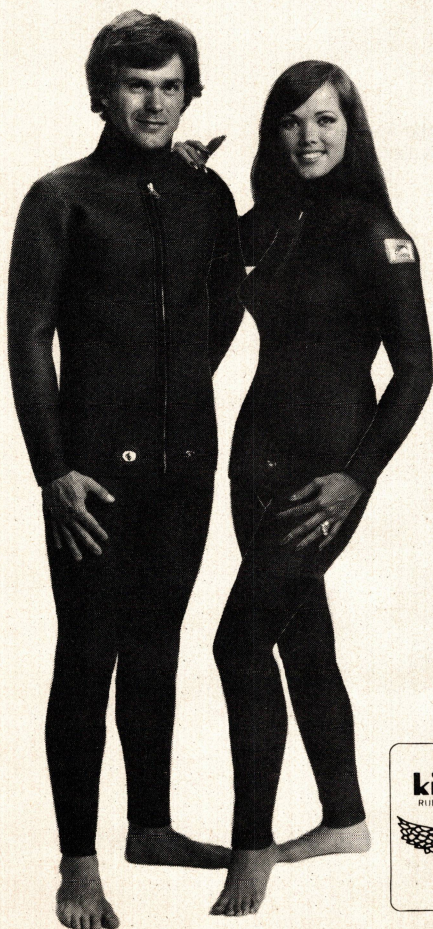


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PHYSICAL STANDARDS

(Continued from Page 16)

routine examination with an otoscope to rule out any acute infectious or chronic structural damage is usually all that is needed. Most physicians doing examinations for commercial divers include an audiogram as a baseline for comparison against a possible future decrease in hearing. However, this is not necessary for most sport divers unless they specifically request it.

Respiratory System — Wheezes, or other alterations in breath sounds should be carefully evaluated to rule out an obstructive process. A past history of major respiratory system damage is significant and may be a possible reason for recommending against diving.

Cardiovascular System — No special considerations are necessary here except those that would limit participation in any active sport, although marked circulatory changes could mean decompression processes will be influenced. An electrocardiogram is suggested for divers over age 40.

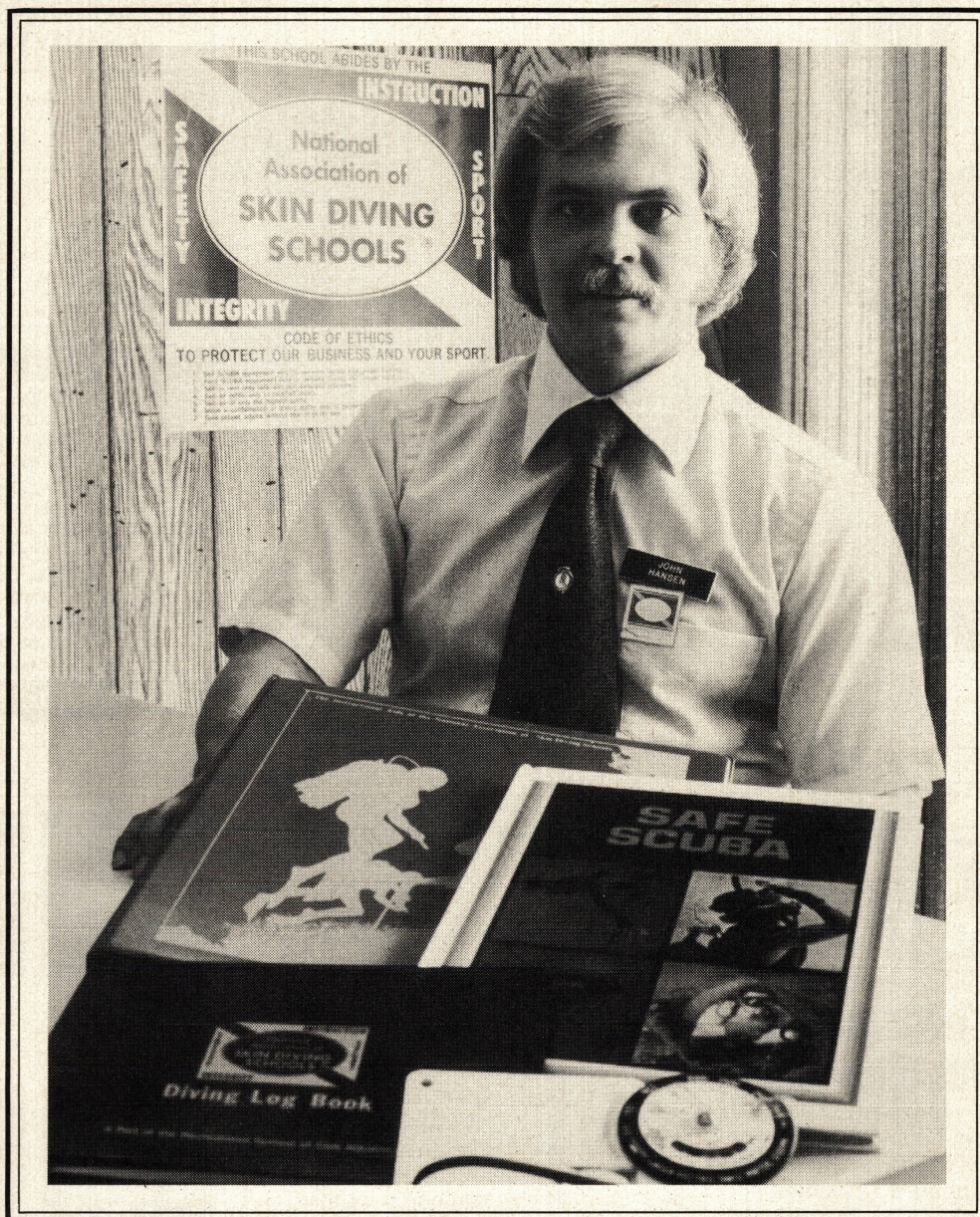
Endocrine System — No known correlation with diabetes, thyroid, or adrenal disease and a propensity for diving accidents has been made. However, diabetes mellitus has been a cause for concern with our UNEXSO Diving Medicine Training Program physicians. A juvenile, or brittle diabetic is thought to be at risk by virtually all these doctors, and even well-controlled diabetes is thought to be a contraindication to scuba diving by more than 40% of the diving physicians.

Neurological System — The symptoms of serious diving trauma, such as decompression sickness, or air embolism, are most often apparent as an injury to the central nervous system. Therefore, careful evaluation and recording of baseline findings are essential here. Any naturally occurring state that could potentially be mistaken for pathology (i.e., eye muscle imbalance or unusual reflexes of a diver candidate) should be explained to the patient by the doctor. The diver could then inform an examiner in a casualty situation should the need arise. A history of seizures or syncopal episodes should also be noted.

Psychiatric Evaluation — An assessment of a candidate's past and present behavioral patterns is necessary, not only for the diver, but also to protect any future buddies. This, in some ways, can be the most difficult part of the examination and requires extreme honesty on the part of the diver, as well as a helpful attitude on the part of the physician. The significance of drug usage and subsequent diving is not well understood.

Once a history is taken and an examination of the candidate is performed, the physician is faced with evaluating results and making a recommendation.

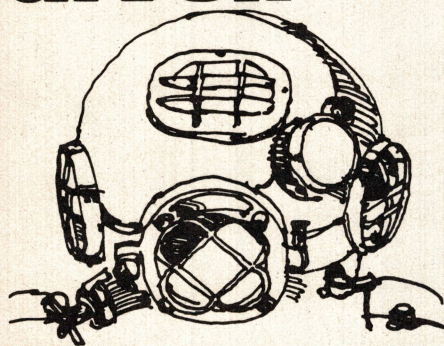
I CARE TOO MUCH ABOUT YOU TO LET YOU SLEEP IN MY CLASS



Remember when diving was for heros and the instructor expected you to be scared when you went into the water? You can thank NASDS for getting rid of that syndrome in the sport. NASDS feels that you took scuba lessons because you were interested in OUR subject. Years ago NASDS developed a standard teaching manual, The Red Book, and while we were at it we also wrote Safe Scuba, our workbook text to go along with the manual. NASDS also pioneered the Log Book concept and the Time Calculator to make your diving more interesting and more fun. Most important, NASDS has trained over a thousand sensitive, knowledgeable instructors to help you enjoy the diving you do. Some people would have you believe that the workbook and standard text was their idea or a brand new idea. When there is a brand new idea in diving education, look for NASDS. They are the people that started it all.

For more information regarding NASDS, including the 10 week Instructional College that trains sensitive, knowledgeable instructors for a life time career in the diving industry write: NASDS, P. O. Box 7666, Long Beach, California 90807. Phone (213) 595-5361.

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The Ocean Corporation

Commercial Diver Training Division
5709 Glenmont, Dept. S (713)661-0033 Houston
Texas 77036

8TH FSDA FILM FESTIVAL



photograph by Paul Tzimoulis

February 27 and 28 are slated for the 8th Annual Florida Skin Divers Association Film Festival in Tampa, Florida, hosted by the Florida Underwater Picnic Society. This year promises to be the biggest and best ever boasting the outstanding leaders of the underwater world participating.

The Big Splash-Evening Film Festival at Tampa's McKay Auditorium will feature Al Giddings' *The Sea Of Eden*; Jack McKenney's *With Williamson Beneath the Sea* and *Fish Antics*; T. Walker Lloyd presenting *The Author Meets Jaws*; and Rick Frehsee's *The Spiny Lobster*. Harry Shanks will be the evening master of ceremonies. Mark Todd Productions, Inc., is in charge of speakers, seminars and film festival production.

The two concurrent Come Dive With Us morning sessions on Saturday, February 28th, are Wreck Diving and The Sea and Its Occupants. In the afternoon the subjects are photography and Dive The World. These seminars will feature speakers from the evening Film Festival as well as Nancy Sefton, Mike Mabry, Burton McNeely, Joyce Markstahler, Eugene Shinn, and Jack Wright.

In addition to the daytime seminars and the evening film festival on February 28th there will be a booth and exhibit area at the Festival's official motel — the International Inn. The Decompression Party in the booth area on Friday night, February 27th will start the festivities.

Tickets are \$5.00 for the decompression party; \$5.00 for the daytime seminars and \$5.00 for the evening film festival.

Tickets and further information, as well as photo contest rules can be obtained by writing to: FSDA Underwater Film Festival VIII, Box 959, Tampa, Florida 33601.

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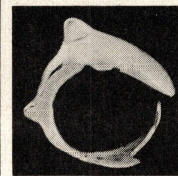
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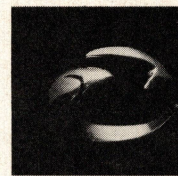
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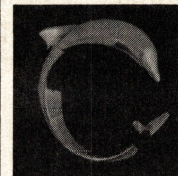
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Sterling with 18"
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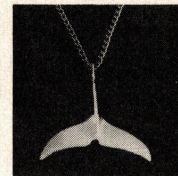
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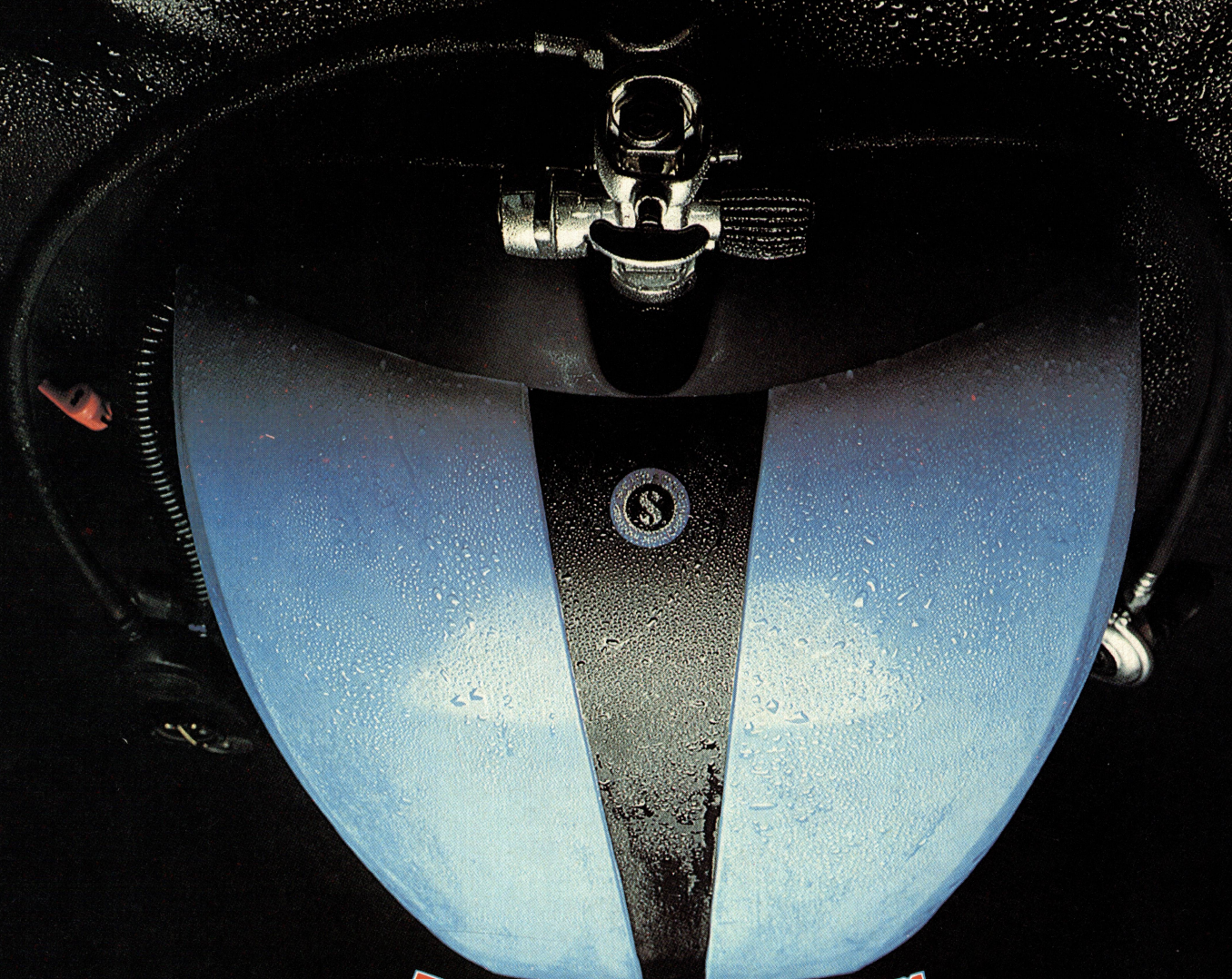
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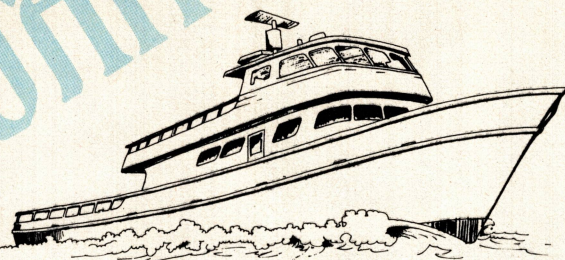


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Send your entry along with your name and address to:

Pacific Sport Diving Co.
4104 East Anaheim Ave.
Long Beach, Calif. 90804

Official Rules

1. The Pacific Sport diving contest is open to everyone except owner's employees, their respective advertising or public relations agencies and their immediate families.
2. The entries will be judged by the officers of the company. The decision is absolute and final in all matters relating to the prizes.
3. All entries become the exclusive property of Pacific Sport Diving and none can be returned. Entry in the Contest constitutes permission to use the winning name and name of entrant in any manner by Pacific Sport Diving, its advertising or public

4. All prizes will be awarded as specified. If the Grand Prize winner is under 21 years of age, parental or guardian approval is required prior to the awarding of the prize. No substitutions for prizes offered. This offer is void where prohibited by law. No purchase required to enter.

5. A list of the top winners will be provided upon receipt of a written request and a stamped, self-addressed envelope. All entries must be postmarked by March 31, 1976 and received no later than April 10, 1976.

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"THE BUDDY is an international guide for sport divers wishing to better plan their diving holidays. Each month a different location is reviewed so that you'll know what's happening above and under the water at diving facilities all over the world. You'll know what to expect from dive operators and guides and most importantly, what's happening underwater.

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January-March (weekends)

25th UICC, Los Angeles, Calif. Pretesting, Dec. 6-7. (Contact: Los Angeles County Underwater Unit, 155 W. Washington Blvd., Los Angeles, CA 90015. Phone: 213-749-6941, ext. 636)

January 2-10

NAUI Instructor Training Course, Honolulu. (Contact: Glen Egstrom, 3440 Centinela Ave., Los Angeles, CA 90066)

January 5-March 12

NASDS Instructional College, San Diego, Ca. (Contact: NASDS, P.O. Box 7666, Long Beach, CA 90807)

January 5-March 12

PADI Instructor Training Course, Jacksonville, Fla. (Contact: PADI College, 4593 St. Johns Ave., Jacksonville, FL)

January 12-April 1

PDIC Instructor College, Monterey. (Contact: PDIC, 320 Hoffman, Monterey, CA 93940)

January 18-May 12

NAUI Semester Instructor Training Course, San Diego State University. (Contact: Mark Flahan, 4971 Mt. Gaywas, San Diego, CA 92117)

January 24-25, March 22-27

PADI Instructor Training Course, Highline College, Seattle. (Contact: Peter Williams, 29637 11th Pl., Federal Way, WA 98003)

Jan. 30-Feb. 1, Feb. 27-29, Mar. 26-28, Apr. 23-25
YMCA Instructor Institute, Greenville, S.C. (Contact: C.B. Carter, P.O. Box 628, Brevard, NC 28712)

February 7, 21, 22; March 20-21; April 24-25

YMCA-PADI Instructor Institute, Metro New York — Nassau County. (Contact: Walt Hornberger, 7161 Spire Falls Rd., Gansevoort, NY 12831)

February 7-15

YMCA Scuba Instructor Institute, Freeport, Bahamas. (Contact: Lynne Hardin Sweeney, P.O. Box 331, Key West, FL 33040)

February 16-20; April 17-18

PADI Instructor Training Course, Detroit. (Contact: Eduard Arszno, 26550 Grand River Ave., Detroit, MI 48240)

February 23-28

NAUI University of Hawaii Course for Physicians, Truk, Micronesia. (Contact: Jon Pegg, M.D., P.O. Box 1384, Honolulu, HI 96807)

February 29; March 20-21; April 3-4; May 15-16

YMCA Scuba Instructor Institute, Great Lakes Region. (Contact: John H. Simpson, 33112 Lake Rd., Avon Lake, OH 44012)

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March 6-June 5 (weekends)
NAUI Instructor Training Course, Rockport, MA. (Contact: NAUI North Atlantic Branch, Box 291, Back Bay Annex, Boston, MA 02117)

March 14, 27-28; April 24-25; May 29-30
YMCA-PADI Instructor Institute, Western New York — Rochester. (Contact: Walt Hornberger, 7161 Spire Falls Rd., Gansevoort, NY 12831)

March 14, 20-21; April 24-25; May 15-16
YMCA-PADI Instructor Institute, Eastern New York — Johnstown. (Contact: Walt Hornberger, 7161 Spire Falls Rd., Gansevoort, NY 12831)

March 15-March 21
PADI Instructor Training Course, Jacksonville, Fla. (Contact: PADI College, 4593 St. Johns Ave., Jacksonville, FL)

March 22-28
PADI Instructor Training Course, Jacksonville, Fla. (Contact: PADI College, 4593 St. Johns Ave., Jacksonville, FL)

March. 26-28, Apr. 16-18, May 7-9
YMCA Instructor Institute, Orlando, Fla. (Contact: David W. Dunsworth, 433 N. Mills Ave., Orlando, FL 32803)

March 26-28; April 23-25; May 21-23
YMCA Instructor Institute, Appleton, WI (Contact: Ed Zepka, 600 Ridge Lane, Appleton WI 54911)

April 5-June 24
PDIC Instructor College, Monterey. (Contact: PDIC, 320 Hoffman, Monterey, CA 93940)

April 5-June 11
NASDS Instructional College, San Diego, Ca. (Contact: NASDS, P.O. Box 7666, Long Beach, CA 90807)

April 5-June 11
PADI Instructor Training Course, Jacksonville, Fla. (Contact: PADI College, 4593 St. Johns Ave., Jacksonville, FL)

April 10-17
NAUI Instructor Training Course, Catalina Island. (Contact: NAUI, 2273 Cove Ave., Los Angeles, CA 90039)

April 20-30
PADI Instructor Training Course, Subic Bay, Philippine Islands. (Contact: Roger Settle, DCA-SWP Clark AFB, Box 16949, PSC 4, APO San Francisco, CA 96274)

April 23-25, & 30; May 1-2, 7-9

PADI Instructor Training Course,
Chicago. (Contact: Ralph Erickson, 6033
N. Sheridan Rd., Apt 21G, Chicago, IL
60660)

May 1-9

PADI Instructor Training Course, Nassau,
Bahamas. (Contact: Fran Young, East Bay
St., Box N-1658, Nassau, Bahamas)

May 15

PADI Instructor Training Course,
Chicago. (Contact: Larry Douglas, 12003
S. Cicero, Alsip, IL 60658)

May 21-29

NAUI Instructor Training Course, Edin-
burg, TX (Contact: Don Lyles, 1407 Cedar
Dr., Edinburg, TX 78539)

May 22-31

NAUI Instructor Training Course, Aviano
Air Base, Italy. (Contact: Jim Haynes,
TUSLOG DET 10, Box 1073, APO New
York, NY 09289)

June 12-19

NAUI Instructor Training Course,
Youngstown. (Contact: Howard Ring,
3121 Davison Ave., Erie, PA 16504)

June 14-June 20

PADI Instructor Training Course, Jack-
sonville, Fla. (Contact: PADI College,
4593 St. Johns Ave., Jacksonville, FL)

June 19

PADI Instructor Training Course,
Chicago. (Contact: Larry Douglas, 12003
S. Cicero, Alsip, IL 60658)

June 21-27

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sonville, Fla. (Contact: PADI College,
4593 St. Johns Ave., Jacksonville, FL)

June 26-July 4

PADI Instructor Training Course, North-
ern Michigan University. (Contact:
George & Betty Tomasi, 455 E. Ridge,
Marquette, MI 49855)

June 28-September 3

NASDS Instructional College, San Diego,
Ca. (Contact: NASDS, P.O. Box 7666,
Long Beach, CA 90807)

June 28-September 16

PDIC Instructor College, Monterey. (Con-
tact: PDIC, 320 Hoffman, Monterey, CA
93940)

July

NAUI Instructor Training Course, Van-
couver. (Contact: NAUI Canada, B.C.,
Box 510, Etobicoke, Ont., Canada)

July 12-September 17

PADI Instructor Training Course, Jack-
sonville, Fla. (Contact: PADI College,
4593 St. Johns Ave., Jacksonville, FL)

July 17

PADI Instructor Training Course,
Chicago. (Contact: Larry Douglas, 12003
S. Cicero, Alsip, IL 60658)

July 23-31

NAUI Instructor Training Course, Peter-
borough, Ont. (Contact: NAUI, Box 510,
Etobicoke, Ont., Canada)

PARKWAY Exposure Garment Quiz

TEST YOUR KNOWLEDGE OF THERMAL PROTECTION

- 1) A "Wet Suit" type exposure garment insulates best when it fits:

☐ A. Very tightly
☐ B. Loosely
☐ C. Snugly

- 2) Worn by a diver at 66 feet a 1/4-inch thick neoprene exposure garment will be:

☐ A. Unchanged
☐ B. Less than 1/8-inch thick
☐ C. 3/8-inch thick

- 3) The outer texture of a Shark-Skin Two suit provides:

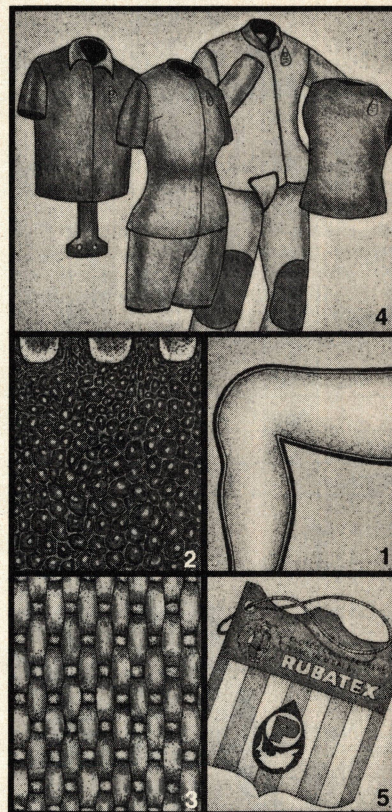
☐ A. Greater flexibility
☐ B. Abrasion resistance
☐ C. A cooling effect between dives

- 4) For personal comfort and safety divers may need exposure garments in:

☐ A. Cold climates only
☐ B. Warm climates
☐ C. Anywhere in the world

- 5) The finest exposure garments are made of neoprene that is:

☐ A. Imported
☐ B. Chemically blown
☐ C. Blown with nitrogen



ANSWERS: 1) "Wet Suit" type exposure garments insulate by trapping a body-warmed layer of water. Loosely fitting suits allow cold water to "pump" through. A very tight fit can inhibit blood circulation and restrict mobility. Parkway suit patterns are made from thousands of body measurements so that they provide the snug fit that insulates best and feels most comfortable. And divers with extraordinary shapes can order custom made Parkway exposure garments that fit snugly like a second skin. C is therefore the correct answer. 2) Exposure garment neoprene rubber contains thousands of tiny cells filled at atmospheric pressure. Upon descent these compress in direct proportion to the ambient pressure. B is the correct answer because at 66 feet the ambient pressure is 3 times atmospheric, compressing the suit to 1/3 its original thickness. 3) Eighty-four "puckers" per square inch give Shark-Skin Two suits amazing hingeability. They bend and flex to help reduce diver fatigue. They also toughen the surface and minimize abrasion. Between repetitive dives the spaces between these "puckers" trap beads of water that help cool the suit and the diver within. Therefore, A, B and C are all correct. 4) Even in the warmest waters prolonged exposure carries off body heat and eventually results in decreased diver efficiency and safety. Because C is the correct answer, Parkway makes a full range of exposure garments. Shirts, shorties and tunics for warm climates and shallow dives. Full suits of every kind for cold climates and deep dives. 5) Durable Rubatex G231 N used in all Parkway suits has proven to be the softest, most flexible and best insulating neoprene for exposure garments. So C is the correct answer.

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Sex Age
Height _____
Weight _____

- _____ Ankle
- _____ Calf
- _____ Knee
- _____ Thigh
- _____ Hips
- _____ Waist
- _____ Chest
- _____ Neck
- _____ Wrist
- _____ Forearm
- _____ Elbow
- _____ Biceps
- _____ Ankle to Knee
- _____ Ankle to Crotch
- _____ Ankle to Waist
- _____ Shoulder Seam to Crotch
- _____ Wrist to Elbow
- _____ Center of back to Wrist
- _____ Wrist to Armpit

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August

PADI Instructor Training Course, Long Island, NY. (Contact: John Lovisolo, 3 Carol Dr., Bethpage, L.I. NY)

August

NAUI Instructor Training Course, Halifax, Ont. (Contact: NAUI Canada, Box 510, Etobicoke, Ont., Canada)

August 1-8

NAUI Instructor Training Course, Atherton, CA. (Contact: Martyn Perry, Menlo School & College, Menlo Park, CA 94025)

August 7

PADI Instructor Training Course, Chicago. (Contact: Larry Douglas, 12003 S. Cicero, Alsip, IL 60658)

August 7-15

NAUI Instructor Training Course, Charlotte, NC. (Contact: Ed Hipp, M.D., 1350 Kings Dr., Charlotte, NC 29207)

August 15-21

NAUI Instructor Training Course, Chicago. (Contact: George Buetow, 2100 S. 9th Ave., Maywood, IL 60153)

September 27-December 3

NASDS Instructional College, San Diego, Ca. (Contact: NASDS, P.O. Box 7666, Long Beach, CA 90807)

September 4

PADI Instructor Training Course, Chicago. (Contact: Larry Douglas, 12003 S. Cicero, Alsip, IL 60658)

INTERNATIONAL DIVING SYMPOSIUM '76

The Association of Diving Contractors in cooperation with the Undersea Medical Society and the American Society of Mechanical Engineers will sponsor the International Diving Symposium '76 in New Orleans at the Louisiana Superdome on January 22-23.

Speakers and subject matter will be carefully selected to provide an outstanding program concentrating on safety and efficiency for those involved in man-in-the-sea operations.

In addition, the Symposium will feature a complete display of the latest diving equipment along with numerous technical exhibits.

Attendance for this year's symposium is anticipated to be at a record high attracting representatives of the diving, marine, and petroleum community from around the entire world.

This Super Symposium is one you won't want to miss. For further information contact: I. F. Hingle, Jr., Suite 105, 405 Gretna Blvd., Gretna, La. 70053. Phone: (504) 362-0074.

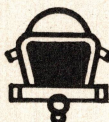
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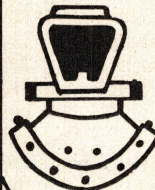
From all stand points — as a business, a potential market, or as a career opportunity — the outlook for the future is extremely favorable.



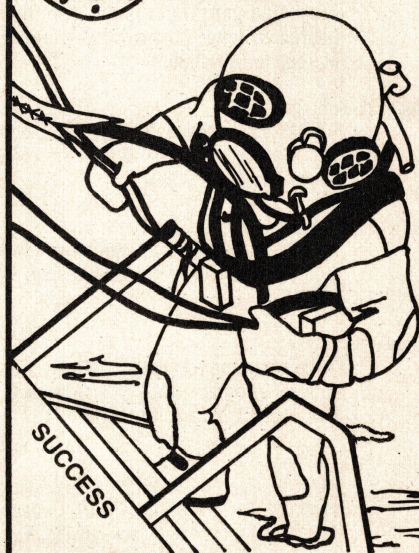
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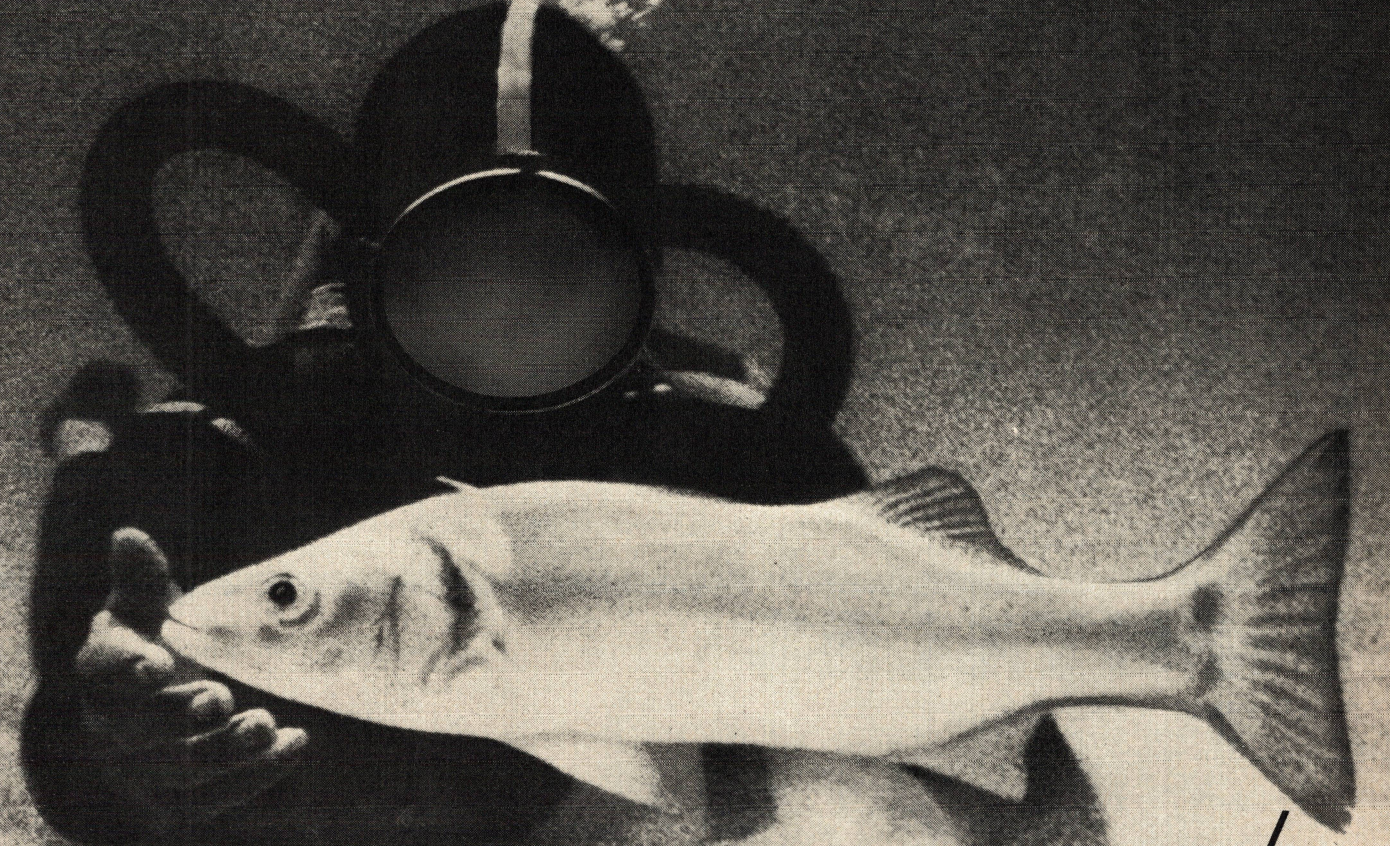
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AND YOU FEED HIM FOR ONE DAY
NOW TEACH HIM HOW TO FISH
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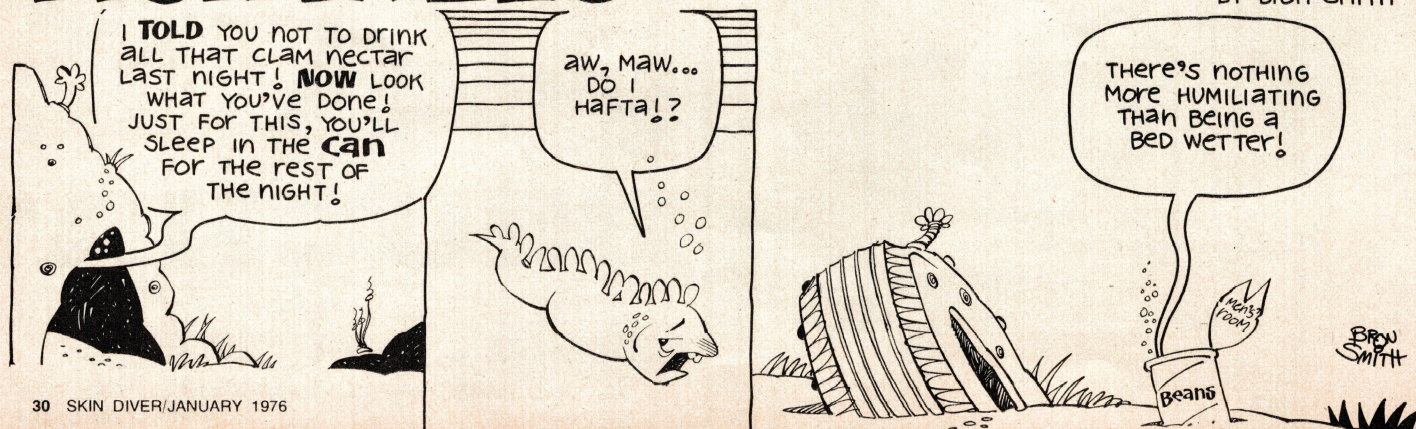
Answers from questions on page 19.

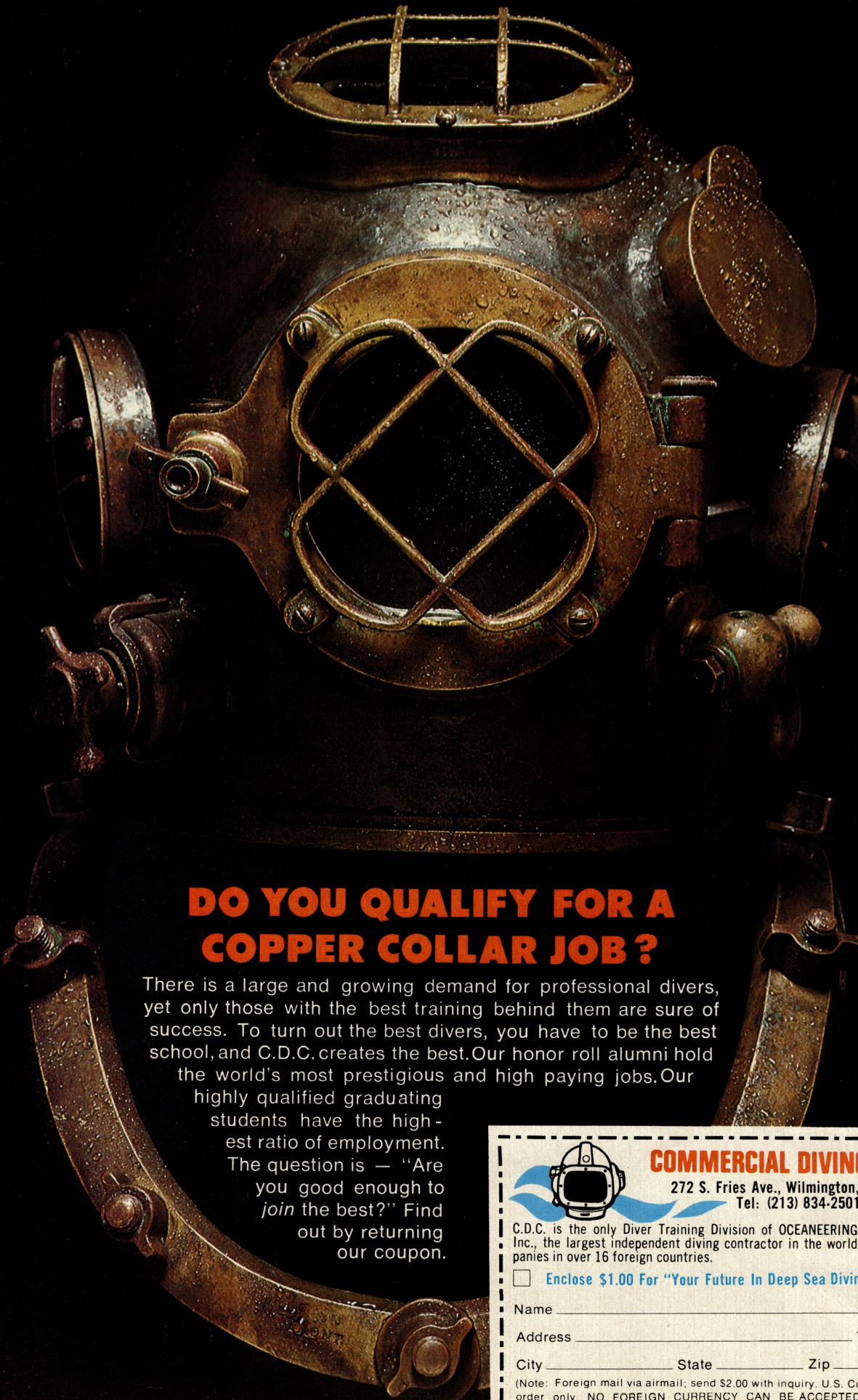
- 1) B. In good health and possessing advanced training in ice diving techniques. Ice diving is a specialty and requires experience and training beyond the basic level plus specialized training in ice diving techniques.
- 2) A. When the ice is a minimum of five inches thick. This thickness is required to support the entire ice diving operation, consisting of several people plus a lot of equipment located in a small area.
- 3) C. Utilize prior knowledge of the intended site. Ice dives should take place in areas you have explored prior to the onset of the ice cover. Imagine going to the middle of a lake, working hard to cut a hole in the ice and finding the water only six feet deep!
- 4) B. Six. The minimum number of participants in a safely conducted ice dive is two divers, two line tenders and two safety divers.
- 5) B. Around the diver's waist and under the equipment. The line should be tied snugly using a non-slipping knot such as a bowline. A properly made harness that fastens securely over the suit and under the equipment is preferable to the rope around the waist, but sport divers may not have the proper harness available. The line should not be tied to the scuba tank or other equipment because of the danger of slippage. A rope tied around the diver's wrist may stop circulation if tied tight enough not to slip off the wrist.
- 6) C. Converting plastic straps to velcro, neoprene or webbing. Plastic equipment straps easily crack or break when flexed under cold conditions.
- 7) B. 1/4 inch farmer john style wet suit, mitts, hood and boots. A standard wet suit does not provide sufficient insulation for the vital organs. The extra layer over the torso, provided by the farmer john pants, adds insulation and reduces circulation of water in the suit. The hood needs to be the cold water type with large bib, and the mitts should be the three finger type.
- 8) A. Care is taken to avoid exhaling through the regulator before it is underwater. Exhaling into a single hose regulator before entering the water can lead to regulator freeze up when the moisture in your breath condenses and freezes inside the second stage. This does not occur with two hose regulators since the pressure reduction stage is surrounded by air, not water.
- 9) A. Prearranged and simple. Standard Navy line pulls are widely accepted, but not required. The signals must be simple, agreed to and understood before the dive.
- 10) B. Increased light penetration and a relative sense of direction. Spokes shoveled in the snow down to the ice and going out from the hole improve light penetration underwater, provide relative direction to divers under the ice and give boundaries for underwater distances.
- 11) A. Should be attached to the diver's waist or harness at all times. The diver is to be attached to a safety line at all times while diving under the ice. Harnesses have been developed for attaching the line to the diver and have been found to be the most effective method of attachment. Homemade harnesses are not recommended.
- 12) B. Be completely geared up at all times. In an ice diving operation, the safety diver must be prepared to enter the water instantly. If a diver becomes detached from the safety line, the safety divers need to begin an immediate search.
- 13) C. 150 feet. Excursions under the ice are usually limited to a 150 foot radius from the hole. The lines for safety divers are 250 feet in length.
- 14) B. Tied to a long ice fishing chisel and hammered into the ice. The free end of the safety line must be secured to something which will not move and cannot fall through the hole. Long ice fishing chisels driven into the ice have proven best for this purpose. As a further precaution, tie a float onto the end of the safety line.
- 15) A. Ascend to the ice and remain stationary. Use your inflatable vest to conserve air. Keep your legs down. Safety divers will soon begin a circular sweep search pattern at the surface with a floating line when you fail to respond to line signals.

Ice diving is a specialty, and as such, requires specialized training. Regardless of your score, if you have not been trained for ice diving, don't try it. Only part of the required knowledge could be tested in this exam. If you are an experienced ice diver and you missed more than a couple of questions, then you too should attend an ice diving course. Techniques and practices are continually changing and improving, and continued education will bring you up to date. If you scored 100%, may all your under ice experiences be enjoyable. Next month's exam will be on Cold Water Diving.

FISHTALES

BY BRON SMITH





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- January 17**
Illinois Council of Skin and Scuba Divers Photo Competition entry deadline. (Contact: Gary L. Chestnut, P.O. Box 116, DeKalb, IL 60115)
- January 22-23**
International Symposium, Louisiana Superdome, New Orleans. (Contact: I. F. Hingle, Jr., Suite 105, 405 Gretna Blvd., Gretna, LA 70053)
- January 24**
Inland Divers 3rd Annual Film Festival & Photographic Workshop, Ft. Worth. (Contact: I.D.A., 6313 Greenfield, Ft. Worth, TX 76135)
- January 24-25**
Innerspace Odyssey—Frontiers in Diving, symposium on diving medicine/legislation, Gainesville, Fla. (Contact: Barnacle Busters Divers, P.O. Box 12823, University Station, Gainesville, FL 32604)
- February 16-21**
West Michigan Sportland Boat Show, Civic Auditorium, Grand Rapids, Mich. (Contact: John D. Loeks, 1400 W. 28th St., Grand Rapids, MI 49509)
- February 27-28**
8th Annual Florida Skin Divers Association U/W Film Festival & Seminar, Tampa, Fla. (Contact: Donald J. Kersting, P.O. Box 959, Tampa, FL 33601 (813) 621-1291)
- February 28**
SE Int'l U/W Photo Competition entry deadline. (Contact: John Rady, P.O. Box 30020, Birmingham, AL 35222)
- February 29**
2nd Annual North Shore U/W Photography Contest. (Contact: North Shore School of Skin Diving, 58 Larkfield Rd., E. Northport, NY 11731)
- March 6**
Boston Sea Rovers '76, seminars, Boston University's Sherman Union, 10 a.m.-4 p.m.; film festival, John Hancock Hall, 8 p.m.; Meet-the-Speakers Party, Dorothy Quincy Suite. (Contact: Glen Reem, P.O. Box 156, Bedford MA 01730)
- March 13-14**
Southeastern Underwater Expo II Jefferson Civic Center, Birmingham, Ala. (Contact: Tony Kalnoky, P.O. Box 30020, Birmingham, AL 35222)
- March 14**
NAUI Int'l Photographic Competition entry deadline. (Contact: NAUI, 6531 NE 198th St., Seattle, WA 98155)
- March 20-21**
Man in the Sea Symposium, Seattle, Wash. (Contact: NAUI North Pacific, 6531 N.E. 198th St., Seattle, WA 98155)

March 27

3rd Annual U/W Panorama & Film Festival — Planet Ocean, Long Island. (Contact: North Shore Diving Center, 58 Larkfield Rd., E. Northport, NY 11731)

April 2

North Atlantic Diving Councils Convention, Harvard University, Boston, Mass. (Contact: Wayne Anderson, P.O. Box 908, Hyannis, MA 02601)

April 3

Underwater Symposium & Film Review, Boston, Mass. (Contact: Fred Calhoun, Box 291, Back Bay Annex, Boston, MA 02117)

April 3

3rd Annual U/W Panorama Film Festival — Planet Ocean, Westchester County, N.Y. (Contact: North Shore Diving Center, 58 Larkfield Rd., E. Northport, NY 11731)

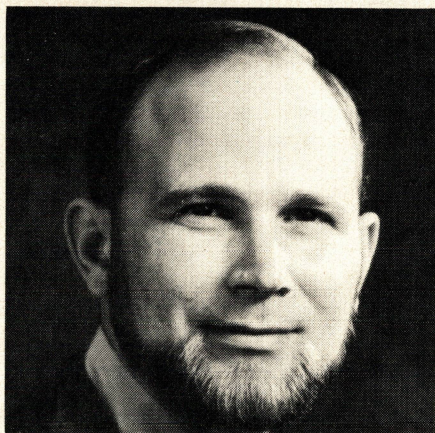
April 25

NAUI Instructor Underwater Film Review, San Diego, Calif. (Contact: NAUI South Pacific Branch, 4971 Mt. Gaywas Dr., San Diego, CA 92117)

May 7-9

6th Annual Our World—Underwater Seminar, Symposium and Film Festival, Sheraton Chicago Hotel and Conrad Hotel, Chicago, Ill. (Contact: Joyce Markstahler, P.O. Box 643, Wheaton, IL 60187 [312] 286-8142)

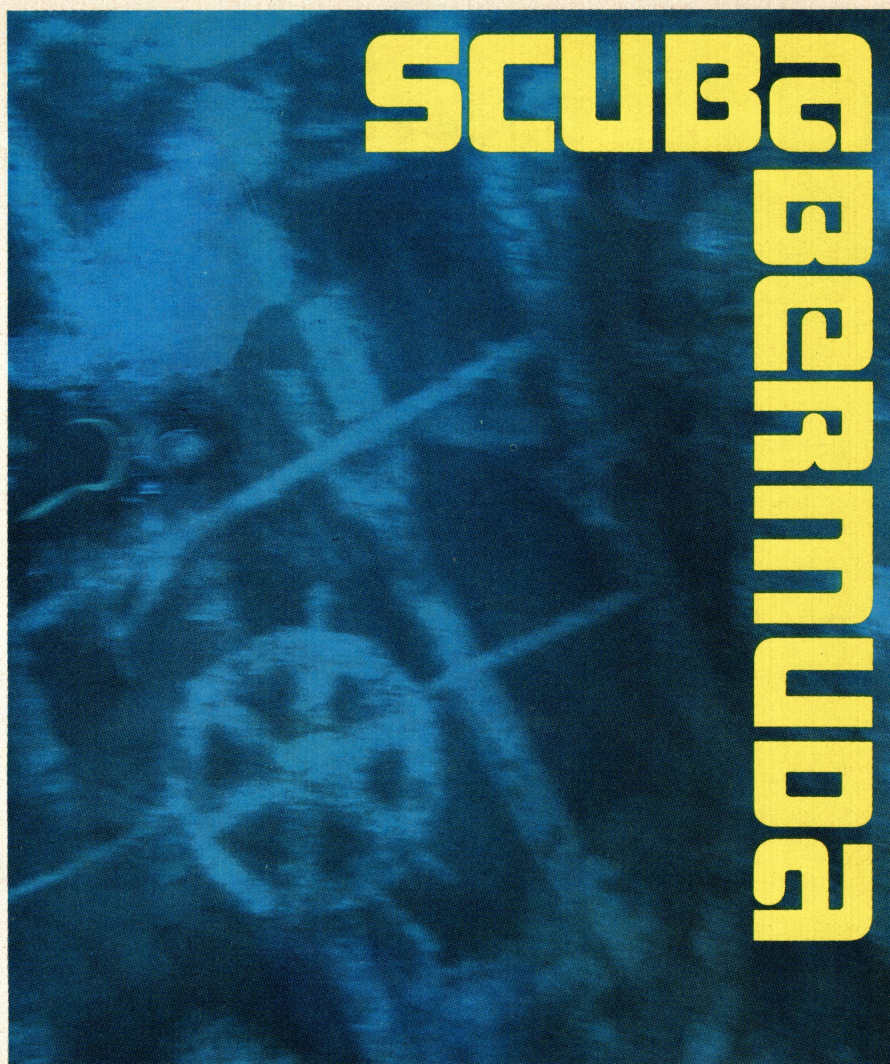
GRAVER JOINS PADI



The Professional Association of Diving Instructors has employed Dennis Graver as National Training Director at the association's Headquarters in Costa Mesa, Ca. Duties will include development and support of Instructor Training Courses, training standards review and revision, public relations and conducting instructor development programs to improve diver training.

Graver has an extensive background in diving instruction from skin diving and basic scuba through instructor training and development. He is well known in the diving community for his articles on diving and diving instruction and as a speaker at numerous diving programs throughout the country.

Active as a diver and an instructor, he will work as a member of the PADI Executive Committee to develop innovative and progressive training programs for the Professional Association of Diving Instructors. >>>



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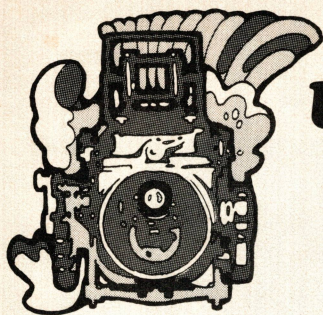
the stately Queen Angelfish. Now's the time to scuba Bermuda.

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LET'S REVIEW THE BASICS



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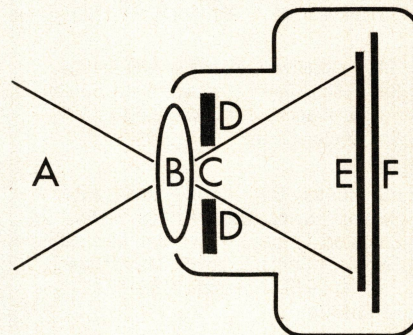
CHAPTER I

ABOUT THE CAMERA

By Jim and Cathy Church

Taking a picture is basically simple — it's a matter of exposing film to a controlled amount of light. Let's review these basics:

- Light reflecting from the subject passes through the camera lens.
- The lens bends the light rays to focus a sharp image on film.
- The width of the aperture affects the amount of light which reaches the film.
- The tiny metal blades of the iris diaphragm regulate the width of the aperture.
- The shutter curtains uncover the film for the exposure.
- The film is exposed to light for only a fraction of a second when the exposure is made.



CONTROLLING EXPOSURE CAN BE TRICKY

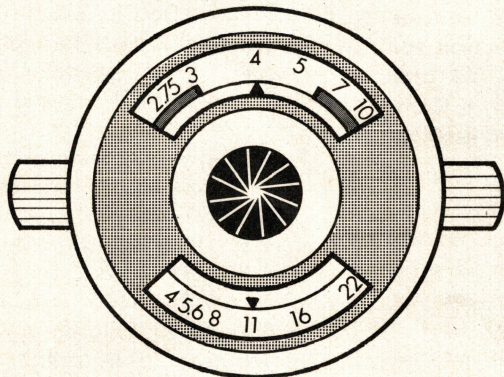
Keep in mind that a controlled amount of light must strike the film. And with any given film, this controlled amount is fairly constant. The reason that exposures can be tricky is because the amount of light available for the exposure isn't a constant — it can vary greatly from bright to dim. This is why simple cameras — with preset apertures and shutter speeds —

sometimes produce overexposed pictures on bright days and underexposed pictures on dark days. For best results, you should have a camera with adjustable controls for both aperture and shutter speed. While some cameras have semi- or fully automatic exposure controls built in, most cameras used for U/W photography must be manually adjusted.

APERTURE CONTROL

BRIGHT LIGHT

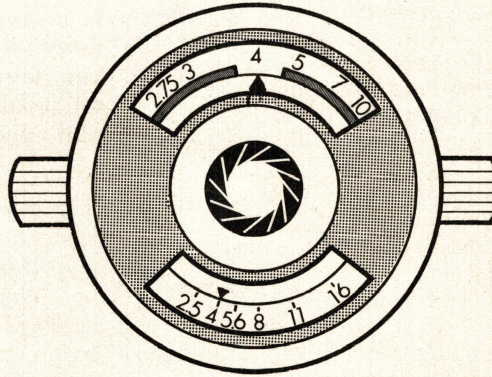
When the sun is bright, the pupils of your eyes automatically close down to reduce the amount of light entering your eyes. When bright light hurts your eyes, you are experiencing an overexposure! The same is true with a camera: the aperture must be closed down to prevent an overexposure of your film.



The Nikonos 35mm lens shown above is set for an aperture of f11. This would be a fairly small aperture for underwater photography — it would probably be used only for extremely bright conditions with available light, or if flashbulbs or a strobe is used. Notice the small diameter of the aperture.

DIM LIGHT

Likewise, in dim light, your pupils open automatically to increase the amount of light entering your eyes. The aperture must be opened wider in dim light to avoid underexposing the film. In extremely dark conditions, artificial light may be needed if the aperture can't be opened wide enough.



This is the same Nikonos 35mm lens, but the aperture has been reset for f4. This wider aperture is more realistic for underwater photography with available light under average conditions. Notice that although f4 is a lower f-number than f11, the aperture is wider.

CONSECUTIVE F-STOP

Full f-stops are calculated so that each consecutively higher-numbered f-stop admits half as much light as the previous stop. Look at the vertical column of full f-stops to the right. Working down the full stop column, f2 will admit half as much light as f1.4; f2.8 will admit half as much as f2, and so on down the column. Likewise, if we work up the column, f22 admits twice as much light as f32, and f16 twice as much as f22. Some cameras have settings for partial f-stops. Reading across the top of the table, f1.6 is one-third of the way between f1.4 and the next full stop, f2; f1.7 is half the way, and f1.8 is two thirds the way from f1.4 to f2. Reading down any of these columns gives changes in full stops.

TABLE OF CONSECUTIVE F-STOP

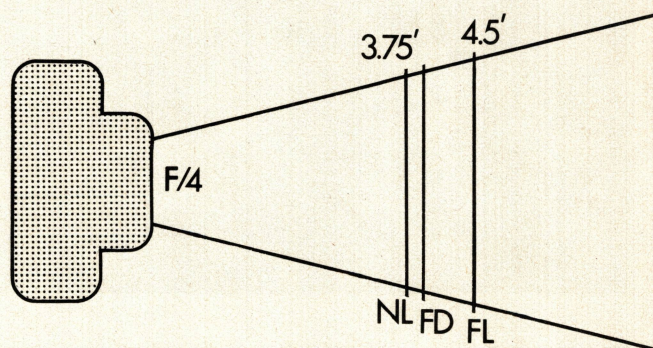
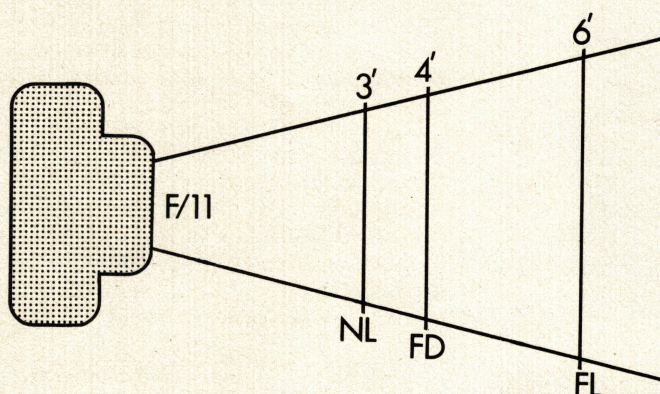
Full f-stop	One-third f-stop	One-half f-stop	Two-thirds f-stop
f1.4	f1.6	f1.7	f1.8
f2	f2.2	f2.46	f2.5
f2.8	f3.2	f3.4	f3.5
f4	f4.5	f4.9	f5
f5.6	f6.3	f6.9	f7
f8	f9	f9.8	f10
f11	f12.5	f13.5	f14
f16	f18	f19.5	f20
f22	f25	f27	f28
f32	—	—	—

REMEMBER: THE HIGHER THE F-NUMBER, THE LESS LIGHT GETS IN!

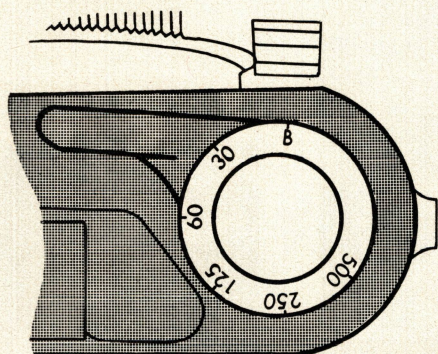
DEPTH OF FIELD

Depth of field is the area in front of the camera which is in focus. This area begins at a near limit (NL) one-third in front of the focused distance (FD), and extends to a far limit (FL) two-thirds behind. The higher the f-number, or the greater the focused distance, the greater the depth of field. Look at the

lenses on the preceding page — both are focused for four feet, but one is set for f11 and the other for f4. Look at the depth of field scales — a set of sliding indicators in the distance scales. The f11 lens has depth of field from three to six feet; the f4 lens, from about three and three-fourths to four and one-half feet.



SHUTTER SPEEDS



Shutter speeds also affect picture sharpness. If the shutter is open for a long time — 1/60 second or longer — camera or subject movement will cause blurry pictures. Faster shutter speeds expose the film more quickly so the effect of movement is less important. Like f-stops, shutter speeds are sometimes used to control exposure. Each time the shutter speed is halved (such as from 1/30 to 1/60), the amount of light passing through the aperture will be halved. Likewise, each time the duration of the shutter speed setting is lengthened (such as from 1/60 to 1/30), twice as much light will pass through the aperture.

PHOTO QUIZ

1. Which aperture would have the widest diameter: f2.5 or f22?
2. If you open your Nikonos aperture from f4 to f2.5, would you more than double the amount passing through the aperture?
3. Would an exposure taken at f8 and 1/125-second admit the same amount of light as an exposure taken at f11 and 1/60-second?

NOTE: Neither Jim and Cathy Church or SDM can critique your quizzes or assignments. These are for your study only. Answers to the above: (1) f2.5, (2) yes, (3) yes.

ASSIGNMENT

Examine an adjustable camera as follows:

1. Operate the aperture control — watch how the blades of the iris diaphragm open and close.
2. Watch the depth of field indicator as you change aperture and focused distance.
3. With front shutter cameras, open the back of the camera and look through the lens as you trigger the shutter with different apertures and shutter speeds.
4. Read the owner's handbook for your camera a second time.



photograph by Jack McKenney

Giant

By Chuck Allen

Man has entered the age of aquaculture because of necessity. We're not exactly reaping fattened aqua crops by means of undersea tractors, but man is starting to garden the sea to reap a profitable catch and yet insure natural replenishment. A few years ago, it was fashionable to speak of the seas as "the farmland of the future". Today, man is attempting to overcome the perils of overfishing and pollution by establishing and preserving an ecological balance and by using long-range management techniques.

Giant kelp, the largest marine plant in existence, grows in the near shore waters of the Pacific Coast and constitutes the main component of elaborate undersea forests. It flourishes in beds up to one mile wide, several miles long, in water from 25 to 80 feet deep, and it usually grows in areas with a rough bottom.

Giant kelp, the largest marine plant in existence, grows in the near shore waters of the Pacific Coast and constitutes the main component of elaborate undersea forests. It usually grows in areas with a rough bottom from a root-like structure called a holdfast clinging to the rocky base. Its long, leaf-like blades extend from gas-filled bladders.



photography by Author



Kelp Aquaculture

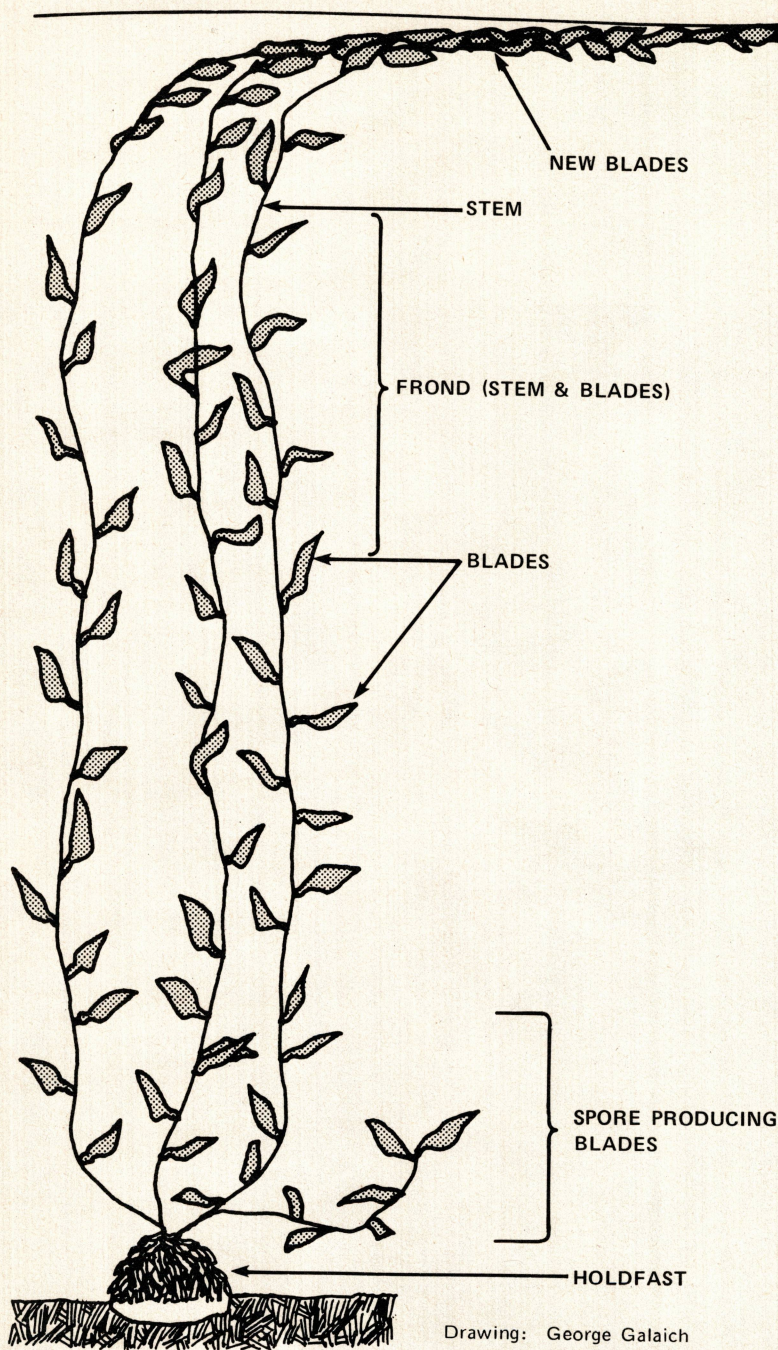
Root-like structures called holdfasts cling to a rocky base while leaflike blades extend from gas-filled bladders. Kelp thrives best in strong ocean currents which constantly renew the nutrients necessary to sustain the giant plant.

Giant kelp is one of nature's fastest-growing plants, sometimes growing at the rate of one to two feet in a single day. Commercial methods of harvesting the giant seaweed actually contribute to the development of the plant. Kelp is cut about three feet below the surface of the water, permitting greater penetration of sunlight to the plants below. Photosynthesis occurs more intensively, encouraging denser and more vigorous growth. New shoots soon reach the surface, and the cycle is repeated in about four months.

But for all that kelp represents to the manufacturer and the consumer it's much more to the wild sea creatures that live in and near the kelp bed. The kelp forest supports a diverse animal community. Some fish browse on its blades and a multitude of snails find food and shelter there. Crabs lurk in the deep shadows at the bottom of the giant plant or crawl toward the surface on the fronds of the plant. Abalone, that great California delicacy, feed upon fronds and other kelp debris which drift along the bottom.

During its life span, the giant kelp experiences numerous problems from both man and nature. White dots often seen on the blades of the great plant are tiny colonial creatures called bryozoans which feed on drifting larval stages of the kelp's worst enemy, the sea urchin. When they are fully grown, sea urchins normally feed harmlessly on the fallen blades of mature kelp plants, but in the late 50's many kelp beds were thinned out by a combination of pollution and a series of years with unusual high temperature. So, the urchins began to attack the kelp's seedlings preventing the plants from reestablishing themselves. As a result, whole areas of sea bed, where once the kelp grew in abundance, were now almost empty. Not only do the urchins destroy many young plants, they also attack the holdfasts of larger plants weakening their grip on the bottom.





Giant kelp is one of nature's fastest-growing plants, sometimes growing at the rate of one to two feet in a single day. Commercial methods of harvesting the giant seaweed actually contribute to the plant's development. This kelp flourishes in beds up to 1 mile wide, several miles long, in 25 to 80 feet of water.

The damaged plant stands no chance when the storm flags are flying. The great rollers of the Pacific surge through the kelp bed dragging the weakened plants from their moorings and casting them up on the shore. Buoyed up by their floating bladders, whole bundles of kelp are torn loose. As a result, the beaches are covered with dead and rotting seaweed which makes kelp very unpopular with sun bathers.

Early attempts to check an overpopulation of sea urchins incorporated the use of divers methodically crushing individual urchins with hammers. A more effective method developed by Dr. David L. Leighton, and now currently being used, is the spreading of quicklime over an infested urchin area.

Kelco company of San Diego has been harvesting giant kelp, *Macrocystis pyrifera*, since 1929. Today, their fleet of seagoing harvesters, streamlined plant operations, and expertly staffed marketing agents and marine scientists enables Kelco to claim the title of "the world's largest producer of algin" and a leader in the field of aquaculture.

Kelco biologists have been working with Dr. Wheeler J. North of the California Institute of Technology attempting to establish a warm water strain of giant kelp in southern California. Kelp spores, obtained from giant kelp plants collected at Turtle Bay, Baja California, are placed in tanks carefully controlled for optimum temperature and nutrient level. These spores attach to small sections of wood dowling and soon develop into male and female gametophytes. Microscopic gametophytes later produce eggs and sperm that combine to form embryonic plants which soon develop into identifiable kelp plants.

Nursery grown kelp plants are readied for transport to a mid-water flotation rack. The rack is placed near an established kelp bed so that the nutrient rich waters flowing about the giant kelps also nourish the young plants. Several hundred plants are held fast to the flotation rack by strong clothespins.

Within several weeks the laboratory-reared plants grow from a speck to a length of about 12 inches. Holdfasts begin to firmly grip the dowling and young plant is ready for another move.

Meanwhile, Kelco divers have prepared the final growing site for the young kelp plants. The area selected for planting once supported giant kelp but now is occupied by palm kelp, *Pterygophora californica*. The divers cut the palm kelp at the base, leaving a sturdy stalk of about three inches attached to the rocky bottom. These palm kelp stalks will serve as

the initial holdfast anchorage until the young giant kelp plant can establish a holdfast for secure attachment to the rocky sea floor.

When the young plants on the mid-water flotation rack reach a length of about 12 to 18 inches, they are carefully removed and placed in underwater game bags and transported by boat to the "cut" area. The plants are kept submerged in sea water during the move.

At the cleared area of palm kelp stalks Kelco divers take the young giant kelp plants underwater and attach them to palm kelp stalks with rubber bands. Experiments are continuing to determine if these warm water kelp plants will survive in Southern California.

The primary transplanting method used by Kelco divers to establish new giant kelp beds is the translocation of young kelp plants, (18 to 30 feet in length). Divers select young plants from among a well-established bed where excellent germination has occurred, and place them into large underwater game bags. With bags full, Kelco divers transit the plants by boat to an area void of the giant kelp but with the necessary characteristics for a kelp producing area having compatible temperature ranges, rocky bottom, and an acceptable depth range. The young plants are then firmly attached to palm kelp stalks with rubber bands and within several months a flourishing new kelp canopy signifies the success of properly applied aquaculture techniques. Over the past two years Kelco has been responsible for transplanting approximately 23,000 giant kelp plants in the Point Loma and North La Jolla near shore areas.

The main ingredient sought from kelp is algin, a colloidal substance having the unique property of absorbing large quantities of water. Algin is the general term designating the hydrophilic or water-loving derivatives of alginic acid which are produced by Kelco as uniform, free-flowing granular or fibrous powders. Algin products will thicken, suspend, and stabilize systems frequently incompatible with other known colloids.

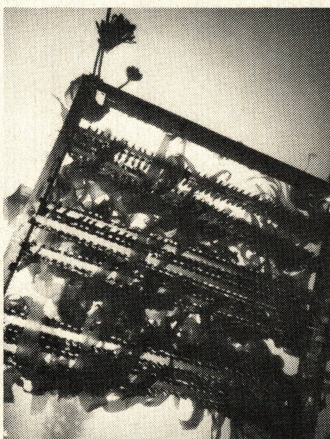
Algin is used in a wide variety of foods including desserts, gels, puddings, milk shake mixes, toppings, dairy products, canned foods, bakery fillings and icings. Salad dressings are emulsified and stabilized with algin. In bakery products, from cake mixes to meringues, texture is improved and moisture is retained. In frozen foods, the stabilizing properties of algin assure smooth texture and uniform consistency on thawing. Kelco algin promotes flavor release, natural color and enhanced eye appeal.

Beer foam stabilization is also one of the more unusual uses of algin. From carpets to drapery and upholstery fabrics, textile printing is facilitated through the use of products from the giant seaweed. Algin products are well known throughout the pharmaceutical and cosmetic industries. Some function as tablet binders, others as tablet disintegrants. They are used to form gels, thicken liquids, stabilize emulsions, and they find application as suspending agents, emollients and lubricants.

In the building industry, algin finds wide application in plaster and cement products such as wall joint cements, tex-

ture paints, patching plasters, crack fillers, and many other specialty products. Even the paper industry has algin products playing important roles in sizings and coating. Actually, we probably come into contact with a tiny bit of kelp every day of our lives.

As giant kelp aquaculture techniques are advanced toward the goal of restoring natural balance to the kelp forest community in which anemones, sea urchins, fish, and sea otters can live harmoniously together, the giant kelp may someday continually supply algin for the chemist, an ideal home for marine creatures, and a wonderland for divers.

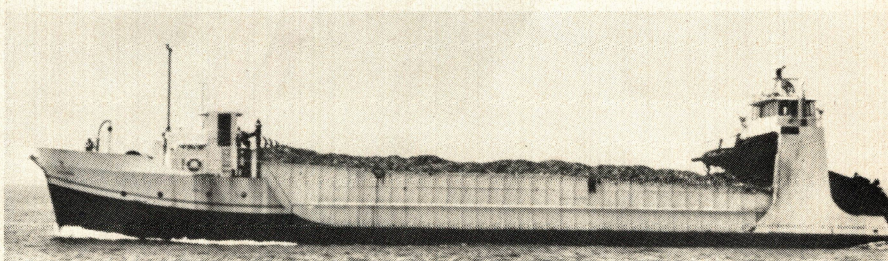


Nursery grown kelp plants are readied and transported to a mid-water flotation rack, such as the one shown on the left. Several hundred plants are held fast to the rack by strong clothespins.

When the kelp plants on the flotation racks reach a certain length, they are carefully removed and placed in underwater game bags and transported by boat to an area where palm kelp has been cut, leaving a sturdy stalk of about three inches attached to the rocky bottom. Below, a Kelco diver attaches young giant kelp.



The bottom picture shows the kelp cutter transiting the giant kelp beds of Point Loma, San Diego, California. These harvesting boats used by Kelco can harvest as much as 300 tons of kelp in a day.



what you should know about

MA

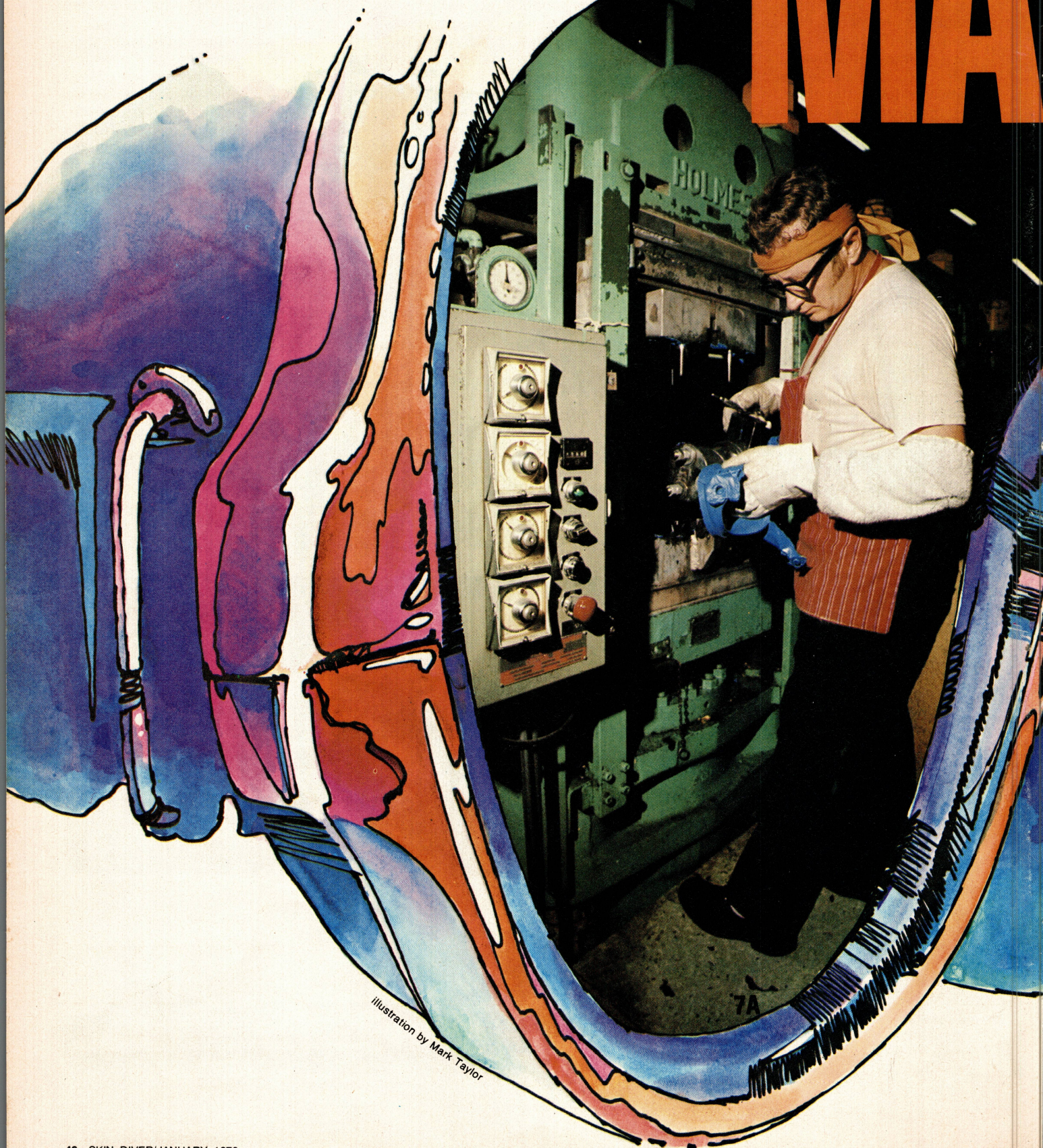


illustration by Mark Taylor

SKS

and how they're made

By Jack McKenney

Have you ever given any thought to the incredible amount of engineering and fabrication that goes into building a "simple" face mask? Do you know that the photos on these two color pages represent only three steps out of about 20 or so that it takes to manufacture a mask? The process also involves literally hundreds of thousands of dollars worth of machinery, and upward of about 20 to 30 people before the mask can be shipped to a dive store.

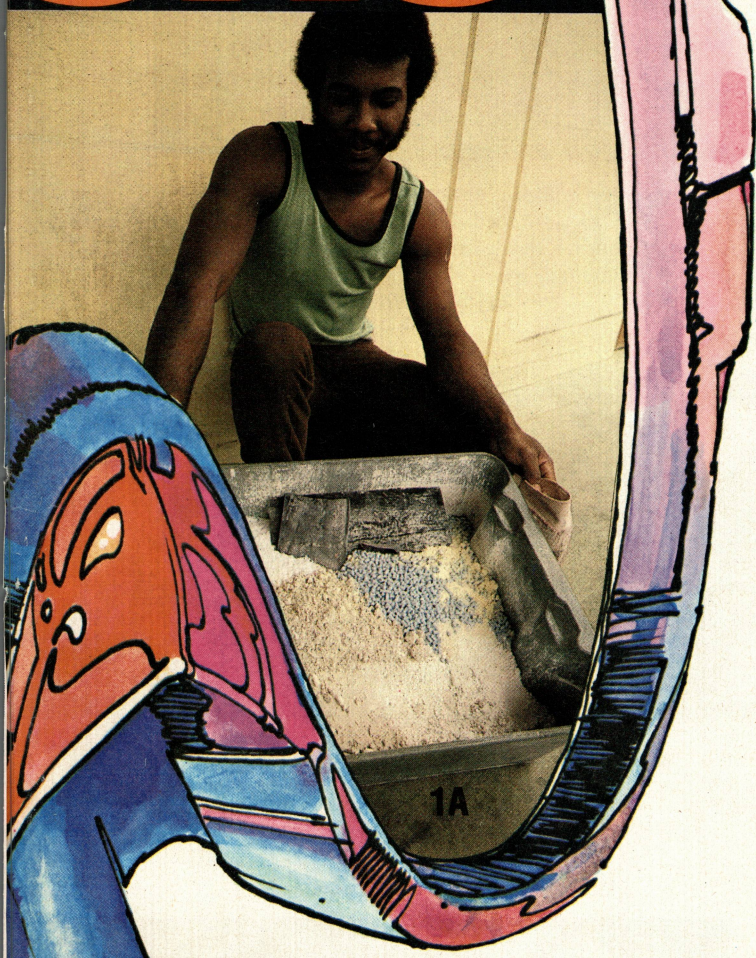
Recently, I went to AMF Swimaster, Healthways, Hydro Rubber, Scubapro, Sportsways and U.S. Divers Co., to obtain an accurate picture of exactly what is involved in making a mask. Basically, the overall manufacturing process is the same at all of these companies. However, there are certain individual fabricating refinements geared toward each company's product — e.g., in each plant all of the jigs for crimping, forming, or holding the mask together to put the glass in place and secure the metal bands are "one-of-a-kind" machines.

Banbury machines costing upward of \$100,000 are sophisticated mixing machines that are used to mix and blend the nine or so chemicals with synthetic, and/or natural gum rubber. Giant mills for sheeting the rubber to size represent another \$5-\$60,000. Tooling alone — the mold in the press around which the rubber forms — can run upward of \$5,000 to \$10,000 depending on the mask design and quality of workmanship.

After the rubber compound comes out of the mills and is cut into predetermined squares it then goes into either a compression press, or as long strips into an injection molding machine. In the compression press strips of rubber, weighed and cut to size are placed around the mold, closed up, and under some 2000 to 3000 psi of pressure and around 300° to 350° F the rubber is cured around the mold in 10 to 12 minutes. In an injection mold the machine automatically feeds preheated rubber into the mold. This process takes about one and a half minutes to produce a molded skirt, but is a more mechanically complicated and oftentimes a more costly procedure.

Ninety-five percent of the close to 750,000 masks made in the United States each year are black for the simple reason that carbon black is the most common and best filler for adding to the physicals of the rubber, i.e.: tear resistance, strength, durability, etc. It is also the best ultra-violet inhibitor — that's why automobile tires are black. Also, because yellow, blue and other light colored rubber picks up dirt in the molding process, there is a higher scrap rate resulting in a greater cost.

When you realize that building a mask is such an expensive and complicated proposition, it's rather intriguing that a top quality face mask will only cost the consumer about \$20. Turn the page for a step by step pictorial spread depicting this fascinating manufacturing process.



photography by Author

7B

1. The chemicals used to make the rubber (see photo 1A on page 41): Zinc oxide and stearic acid are necessary as a vulcanizing aid; anti-ozonents and anti-oxidents prevent cracking and breakdown of rubber; hydrated silica and/or carbon black or clay increases tear resistance; oil allows the rubber to flow better in the mold; molecules bond better with sulphur; accelerating agents are used for curing.



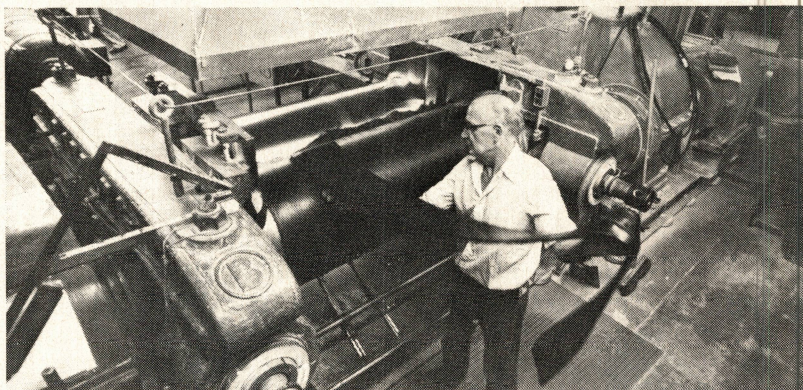
2. Along with a block of natural rubber from Malaysia or Indonesia, or a U.S. synthetic rubber, the chemicals are blended together in a Banbury machine between 180 and 200 degrees Farenheit for about six minutes.



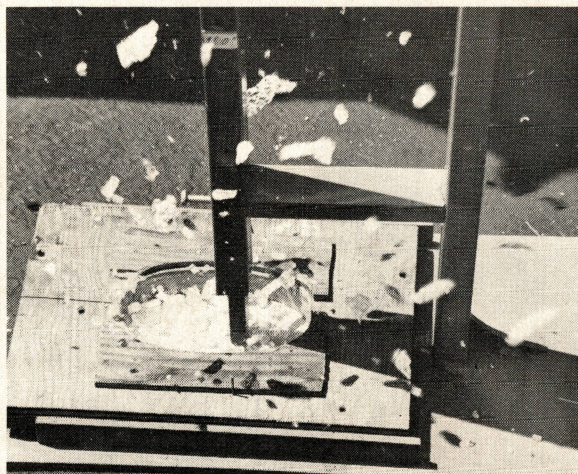
5. The rubber is then cut into smaller sections, weighed and stacked for delivery to the presses.



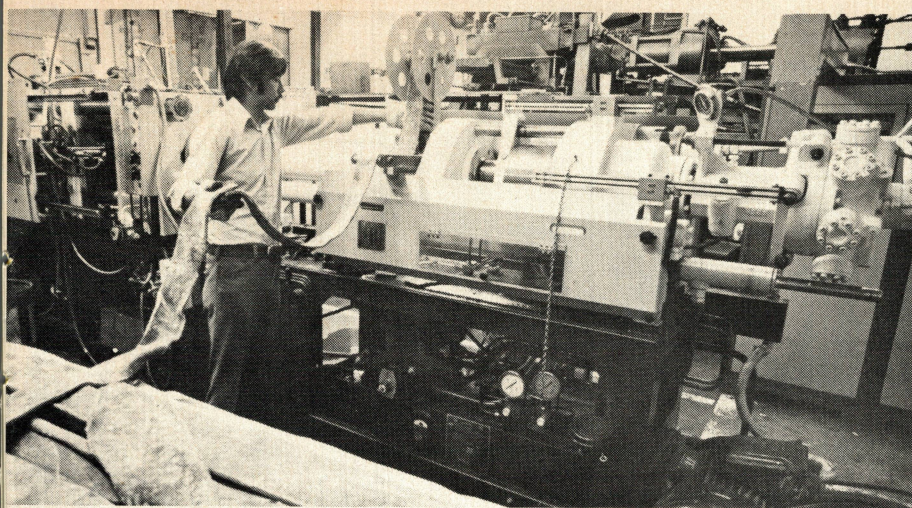
3. After the rubber compound comes out of the Banbury, it is milled and soaped to prevent it from sticking together, and then cooled to room temperature. A tiny plug is put into an \$8000 Reometer machine to test the rubber for curing properties.



4. After testing, the rubber is run through still another mill and then cut into various lengths, widths and thicknesses.



6. Glass that is ordered from outside sources is checked for dimensions and breaking strength before being delivered to the assembly room.



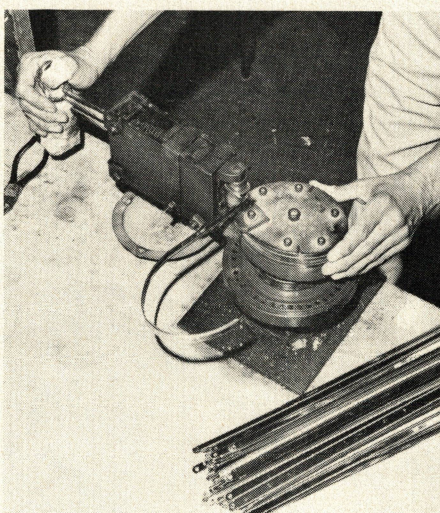
7. Strips of rubber are fed into an injection molding machine that cures a mask around a mold in one and a half minutes, or pieces of rubber, cut to specified sizes and weights, are laid on molds in a compression press (see photo 7A on page 40) and molded in ten to 12 minutes (see photo 7B on page 41).



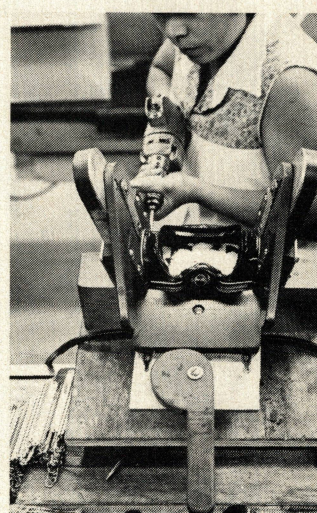
8. The excess rubber, or flashing, is trimmed off by hand. In some cases the edges are buffed smooth, then washed in a giant washing machine.



9. All masks are then tumbled in a tumbling machine with silicone impregnated rags to give them a protective coating of silicone, and to make them aesthetically pleasing to a diver.



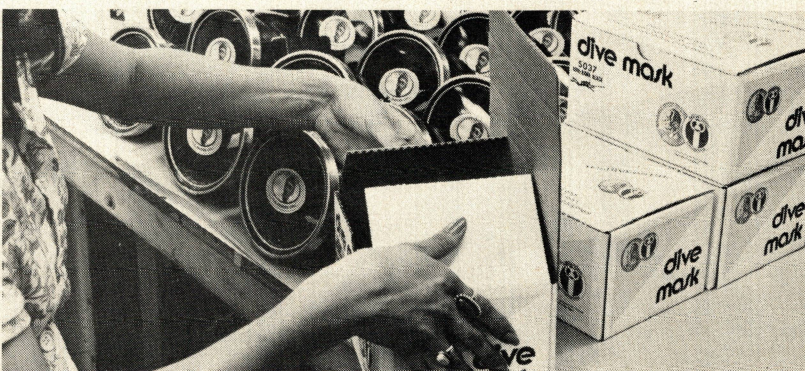
10. Metal bands are formed in a jig to hold the glass for the masks in place.



11. Special clamping jigs are made for each model mask to facilitate attaching metal retaining band, screws, glass and metal clips. The strap is put on mask without use of a machine.



12. Some masks, especially those with purge valves, are tested; leakers repaired.



13. After cleaning the glass the masks are boxed and ready for shipment. Whether a mask is used in a chlorine pool or in saltwater, neither element has a greater deteriorating effect on it than the other, providing simple maintenance is kept up. After use the mask should be rinsed off in fresh water and allowed to dry in a cool, dry atmosphere. Ozone and sunlight are the worst enemies of a mask. Spraying it regularly with silicone and treating it with Armor All will increase the life of the rubber. A mask can last three years if so maintained.

Under The Top Of The World

Rare, First Diver Photos Beneath The North Pole

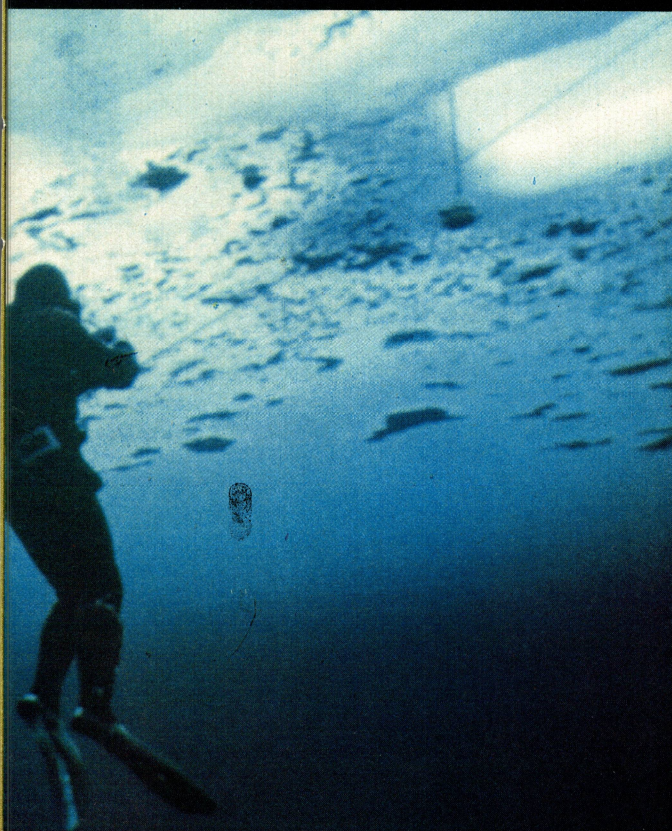
By Joseph B. MacInnis

The ice overhead shivers with brilliance. An infinite skylight bathed in sapphire, with menace hidden behind its beauty. I hang suspended in the crystal silence; below me the ocean plunges 13,000 feet into black oblivion.

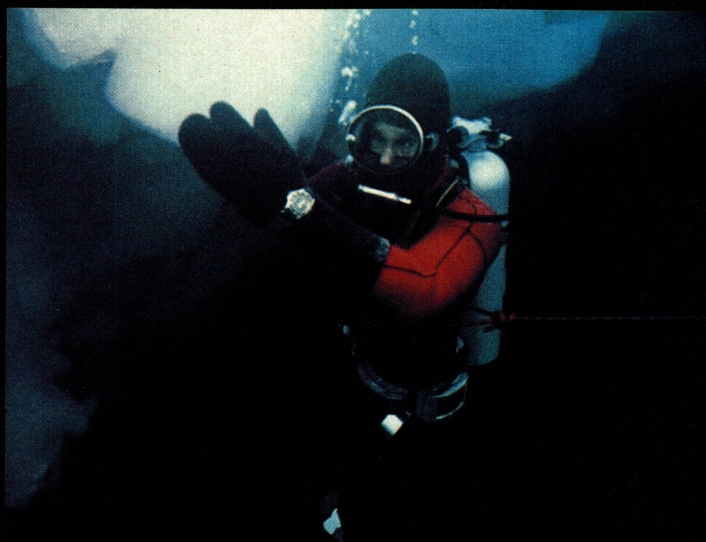
I burrow down inside my wrinkled diving suit. A trickle of flame-cold water scalds my neck. Ahead, in the gloom, is an enormous white wall — a tortured construction of gaunt, bare slabs of ice. At last, after four years of planning, I am under the North Pole . . . the top of the world . . . a white ghost place where all meridians meet and every direction is south. A wild unmarked spot where it is midnight for 80 days and the midsummer sun never sets.

The dream of being the first man to dive under the North Pole had been with me since 1970, when I brought my first expedition to the Arctic and spent seven days exploring under the ice of Resolute Bay. We returned to the Arctic twice for more dives, always building up to this supreme adventure under the Pole, one that we knew would challenge our courage and our physical endurance to their limits. Then, at the last moment, it appeared that all our





The purpose of the dive under the North Pole was a better understanding of the forbidding ice world that is an important part of Canada. Now the technology exists that allows scientists to make firsthand observations about the underwater life and geography of the North Pole. The author, Dr. Joe MacInnis, led a team of five Canadian scientists and photographers on man's first underwater exploration of the North Pole in the Arctic Ocean early in 1974.



photography by Author

first published in Maclean Magazine

efforts and all our preparations would end in failure.

For days, bad weather made it impossible for our pilots to take off on the final 450-mile flight to the Pole. When the weather finally cleared all we could see below us was hundreds of miles of tortured ice at least two fathoms thick, impossible for us to cut through in the three days we had remaining for our expedition. But as our hopes dwindled, our pilots located a narrow lane of thinner ice right at the Pole and set us down to build our campsite.

Now we have punched through and I took up as the black figure of Rick Mason, an underwater photographer and my companion on three polar expeditions, slips through the dive hole. As he moves toward me with rippled grace his exhaust bubbles rise like a small flight of transparent birds and come to rest on the pale undersurface of the ice.

He carries a large spotlight which drives yellow brilliance through the water. Its thick black power cord snakes out behind him and up to the dive hole as he begins a downward arc toward the ice wall.

The wall was formed as the frozen waters rammed together in an agony of buckled and broken slabs. Propelled by huge and distant winds, the ice has been forced downward into a pressure ridge of fractured terraces. All is deathly silent, nothing hints at the tumult of formation. The wall glows with a heatless light that appears incandescent, a light naked of life and stripped of warmth and safety.

I follow the slow churn of Rick's black fins. As the white cliff draws closer, batwings of apprehension flutter in my chest. I chase them away with thoughts of the magnitude of our being here and the purpose of our adventure.

Knowledge surely. A better understanding of the forbidding ice world that is an important part of Canada. We are trying to explore and comprehend an unseen portion of the planet.

We are also here to better understand ourselves. Men looking for personal limits — each asking the lonely question of self-appraisal — can I? Al Purdy put it well when he wrote:

"I'm so glad to be here
With the chance that comes but once
To any man in his lifetime
To travel deep in himself
To meet himself as a stranger
At the northern end of the world."

We are here to test ourselves and our equipment. How long can we stay? What life-support do we need? What techniques must we develop? This is the most hostile environment on earth and answers learned at the North Pole will widen the gates into other parts of underwater Canada.

Something feels wrong. I look down past Rick's floating form and see the flutter of falling silver. I reach for my camera, but bulky rubber fingers only grope against contours. My viewfinder! A \$300 wide-angle lens is disappearing into midnight. I race down, but my plunge is useless. The lens falls too far, too fast. It is well into a two-mile journey to the bottom. I gasp for breath and wonder how to explain the loss to the friend who loaned it to me.

Rick now plays the light beam over a series of sharp angular blocks jutting out from the main bulk of the pressure ridge. Shrill whiteness turns splendid yellow. Several of the uppermost slabs are covered with sparkling ice crystals.

The light enhances our courage and we slip slowly down toward the winter twilight under the ridge. Columns of crushed ice run in chaotic lines in all directions. At an unknown point in the gauzy light the enormous white keel descends into the frozen indifference of the sea.

We are almost 50 feet down. The dive hole has faded to a small white square. The keel extends a fat bleached lip of ice

out toward our feet. We drop lower for a look beneath it. As we descend our shoulders neatly touch. Our paired breathing lifts away long sighs of near-freezing air. Together our eyes probe the darkening waters. The skeleton shape of two deep ghost peaks stare back. They are a long swim down, further than our courage will take us.

Somewhere below the blackness is the sea floor. On it are mountains standing 7000 feet high. They are part of a range that begins in Labrador and runs for 2000 miles up the eastern shore of Baffin and Ellesmere islands. At the northern tip of Canada these mountains plunge into the sea to become the Lomonosov Ridge. They end their long undersea journey in Russia as the New Siberian Islands.

We drift alone in an enormous body of water. The Arctic Ocean covers some five million square miles; it is bounded by the frozen coasts of Asia, Europe, Greenland and North America. We are 450 miles from the Canadian shore.

The light swings in a slow wide arc. Its glare runs up and over a staircase of torn and tilted blocks. I picture the stormblast of creation: the pack ice in slow movement; howling dark winds far to the south; a groaning collision of ice massing high upon itself; the screaming pressure of blocks grinding deep into the sea; the final mute stability of countless interlocking fragments.

The wall appears anything but stable. It slopes up and away from us. A giant purple-blue overhang. The buoyancy of ice exerts tremendous upward force. Several of the larger blocks are massively undercut and look ready to break for the surface. I picture tons of ice roaring skyward in a runaway upward avalanche that would mean instant death.

We delude ourselves that death will not come if we carefully evaluate the hazards of the sea and the techniques to be used. But diving — especially under the polar ice — is never absolutely safe. Our awareness of this fact is an iron fist, heavy on the shoulder. My arm and hands ache from the cold. Rick and I nod and pull back from the darkness.

Through the mirrored surface of the dive hole I see the distant specks of our three companions on the surface. Ahead of my face mask, a sliver of glass winks and is gone. A faint animal flicker, a scrap of life against a chaos of tortured ice.

Rick and I pause just beneath the surface. From here we can see the full writhing axis of the pressure ridge. It is an endless chain of suspended and unconquered peaks. Canada's oceans contain thousands of miles of similar ridges, but few men have had this intimate underwater view.

Little is known about the architecture and geography of pressure ridges. Knowledge has always been obtained indirectly or secondhand, but now the technology exists to allow scientists to make firsthand observations.

The two of us move into the white water immediately under the dive hole. I see the harsh chisel marks made as the surface team cut through the ice. The three of them, Ernie McNabb, Gary Holmes and Patrick McLaren, lean over to watch us and help us from the water. McLaren is fully dressed and ready to dive. He's a geologist, anxious to get to the pressure ridge.

On the far side of the dive hole a small Canadian flag waves in the current of our arrival. The flag is perhaps the best expression of why we have come. The North Pole is the northern apex of Canada's ocean territories. If we, as a nation, are to understand and manage these territories we must be able to operate anywhere on them — including above and below ice-covered waters.

A hand reaches out and my head breaks through into the cold polar air. Rick emerges, lifts his face mask, and through a beard instantly coated with frost, exclaims: "That was the damndest experience ever!"



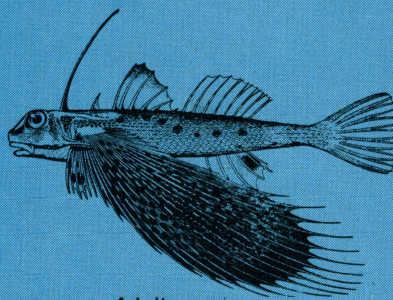
Dr. Joe MacInnis is Canada's foremost diving scientist. He is a poet and author and has had two books published. U/W Images is a book of poems, and his latest, Underwater Man, describes some of his incredible diving experiences. He has led four expeditions to the Canadian Arctic and is responsible for opening up Canada's vast northern ice fields to underwater explorers and scientists.



The Flying Gurnard

(*Dactyloptera orientalis*)

The flying gurnard is the walking armored bird of Hawaii's ocean floor. Whether or not it actually flies is debatable, but the rumor that it can has given the fish its common name. Fishermen have reported it to leap out of the water and travel above the surface in a clumsy manner. The long, spotted, wing-like pectoral fins of this unfishlike fish would appear to facilitate any flying that it might do. However, its heavily armored, box-like body gives ichthyologists reason to believe that it doesn't fly at all, but stays mainly on the bottom where it walks around on its strongly developed pectoral fins. □ The flying gurnard is one of the most peculiar inhabitants of the sea. The square, bony head of the fish is encased in an armor somewhat like a scorpionfish. In addition, there is a single, long dorsal ray that can stand straight up from the back of the head. The scales are tough and ridged, rather like the sharp, bony scutes of the jacks. □ Very often divers will see the flying gurnard "walking" around on the bottom, where it dines on benthic crustaceans, clams, crabs, and an occasional small fish. Ichthyologist John Randall has observed gurnards scratching in the sand with their short anterior pectoral rays as if searching for food. The big wing-like pectorals are spread laterally when the fish is alarmed and it can actually get away at considerable speed if compelled to do so. But, for the most part it remains relatively settled on the bottom, and fairly well camouflaged. The brown spots and blotches blend well into the general confusion of an ocean bottom. The fish has a relatively flat profile



Adult specimen

which also contributes to its ability to remain lost to sight. The juveniles are similar to the adults except that their pectoral wings are shorter. The adults grow to about 14 inches in length. □ The flying gurnard belongs to the Dactylopteridae family of fishes. Dactylopterus comes from the Greek meaning finger and fern, which refers to the specialized fins that enable the fish to scratch for food and creep around the bottom. The dactylopterids can be easily confused with the sea robins (triglidae), which also have large, brightly colored pectoral wings as well as the ability to walk around. The difference between the two is in the arrangement of the head bones. In general, sea robins are bony all over, with no distinct headgear. The gurnards, on the other hand, have the two separate dorsal fins and the single flagpole-like spine. Some ichthyologists have classified the flying gurnards as *cephalacanthus* as juveniles and *dactylopterus* as adults, but for the most part the *dactylopterus* tag is most commonly used. □ This odd family of fishes is not very well represented in the oceans of the world in that there is only a single genus and four species in all. Only one species—the *Dactyloptera orientalis*—is found in the Hawaiian Islands, but where it is found it is common. It is most often encountered in shallow, sandy areas, 20-30 feet deep. Ichthyologist Spencer Tinker has reported the fish from Mauritius and the Cape of Good Hope through the East Indies, along China, Japan, and into Melanesia and Polynesia. The Hawaiian Islands constitute the most northern reach of gurnard range. ➤

Photo By John Boland-Text By Hillary Hauser

Photo taken in 40 feet of water off Maui, Hawaii. Photographer Boland used a Rollei SL66 camera with 120mm lens, Hydro strobe, Professional Ektachrome, 1/30 sec. at f11, 3½ ft. from subject.

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BERMUDA'S RING OF WRECKS

By Paul J. Tzimoulis

Encircled by a wreath of some 500 shipwrecks, Bermuda stands today as a mid-ocean mecca for wreck diving enthusiasts, archaeologists, and amateur marine historians. Few places on earth compare with the overwhelming number or fantastic variety of sunken ships which this tiny island offers. They span over 450 years of history, dating from 16th century treasure galleons to modern day sailing ships and steel hull freighters. The wreck diving opportunities compare favorably with such well known places as Truk Lagoon or Aneгада Reef, except that Bermuda's wrecks are much easier to reach and far more convenient to dive.

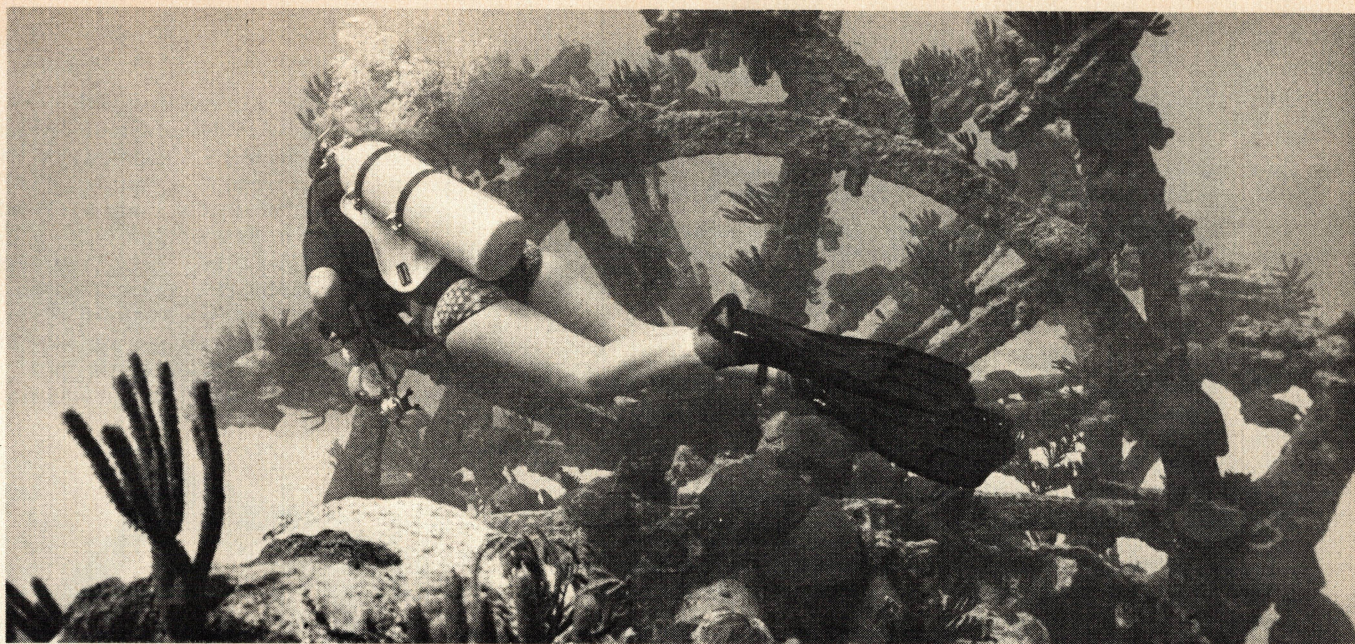
Located 650 miles out in the Atlantic off Cape Hatteras, Bermuda owes much of its earlier history to sunken ships. The

first settlers were actually shipwrecked sailors. And down through the years, much of this island's fame and fortune has been derived from the wrecks. In 1955, Teddy Tucker made world history when he salvaged \$180,000 worth of sunken Spanish treasure from the *San Pedro*. The trove included bars of solid gold, pearl buttons, and a magnificent gold cross set with seven dazzling emeralds. The spotlight again focused on Bermuda in 1968 when Harry Cox recovered \$200,000 worth of gold bars, coins, jewelry, and a solid gold double-link chain from an unidentified Portuguese treasure ship. At present, approximately 150 wrecks have been located by Tucker, Cox, and other Bermudians, but hardly a handful of these wreck-

ed ships have been properly excavated.

Bermuda's latest wreck bonanza is not for sunken treasure, but instead for pure recreational pleasure. An estimated 7000 to 10,000 people are visiting this tiny Atlantic island for diving vacations. The irresistible combination of balmy weather, lack of insects, and good wreck diving have proven a strong lure for American diving enthusiasts. Add to this a fine selection of luxury hotels, excellent restaurants, and great sightseeing and shopping, and you have a pretty good idea why so many divers are heading for Bermuda.

Most visiting divers are after one thing . . . the wrecks. And Bermuda has more of them than a man can explore in a whole lifetime of diving. Some lie just a



On the opposite page, the eroded hull and steel ribs of the *Mary Celestia*, an English built steamer that sank in 1864 under charter to the American Confederacy. She lies in 50 to 60 feet of water, only $\frac{1}{4}$ mile off shore from the Sonesta Beach Hotel. Above, the starboard paddlewheel of the same steamer, standing upright on the sandy bottom like a Ferris wheel. Right, the steering quadrant from the stern of the *Minnie Bresslauer*, a large, steel hull steamer sunk in 1873 in 25 to 70 feet of water, $1\frac{1}{2}$ miles from the hotel.

photography by Author



few hundred yards from shore, within sight of the hotels. Equally important is the fact that Bermuda has well organized, well run diving facilities — all properly checked out and licensed by the government. You can be fully outfitted and out diving a wreck the afternoon of your arrival day!

The Sonesta Beach Hotel is a fine example of what awaits the diver planning a visit to Bermuda. Prominently situated on a rocky bluff overlooking the ocean, this fine facility is more like a seaside country club than just a hotel. A large freshwater swimming pool provides the perfect setting for beginner scuba lessons. There are tennis courts, shuffleboard, paddle tennis, a special glass dome all-weather swimming pool, a

beautiful sand beach, and an undersea observatorium for fish watching. There is enough going on to keep you busy night and day — and the Sonesta is especially good for the complete family or the non-diving spouse.

Located at the far end of Sonesta's beach is a small white building bearing the sign, Sea Safaris, Ltd. Here you'll find a full service resort dive shop operation, complete with equipment rentals, daily dive trips, and instruction. A 16 cfm Bristol air compressor is utilized to pump the shop's 60 aluminum rental tanks. There's a rack of 20 single hose rental regulators with submersible pressure gauges — all U.S. manufactured. Another rack of 20 safety vests completes the safety gear inventory. Suspended on coat hangers

you'll find 24 full wet suit rentals for the chilly winter and spring water temperatures. Most of the suits are by Parkway or Bailey Suit.

Moored just a few feet from the dive shop doorstep is the *Shag-II*, a 27-foot, Bermuda built dive vessel with an 11-foot beam. Equipped with a jet drive engine, the craft can carry 15 divers by Bermuda law and will cruise at 15 mph. Regularly scheduled dive trips depart twice daily at noon and at 2 p.m. If things get really busy, a third dive is scheduled for the morning. Another 33 foot vessel called the *Scalawag* is kept in reserve to accommodate larger groups and trips to the western reef.

Sea Safaris, Ltd. is owned and operated by Kevin Burke, a very affable



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Yorkshireman who makes friends easily and quickly, wins the admiration of all who dive with him. A veteran diver of 24 years, Kevin became a certified BSAC diving instructor in 1953. He has lived and worked in Bermuda for the last 16 years, operating a resort diving business at the Sonesta Beach Hotel for ten years. Peter Reinthaler, an Austrian diver, serves as both shop manager and skipper of the *Shag-II*. With sharp-eyed vision for shore bearings, and precise maneuver-



Looking back through the wreck of the steel hull steamer, Minnie Bresslauer.

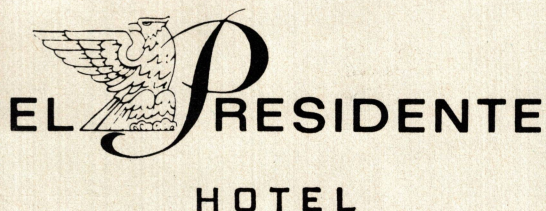
ing of the ship's wheel, Peter finds the unmarked wrecks with ease and certainty. Barrie Brooks completes the shop staff as chief scuba instructor and operator of the compressor system. Barrie is both BSAC certified and Bermuda licensed as a scuba instructor. Barrie has a smooth way of teaching and turns even the most timid neophyte into a raving enthusiast in short order.

Perhaps the most delightful aspect of diving from the Sonesta Beach Hotel is the remarkably close proximity of the wreck sites. Not more than a half mile directly offshore from the hotel lies the remains of a side-wheel steamer called the *Mary Celestia*. It takes the dive boat four minutes to reach the spot and the depths are only 50 to 60 feet. The *Mary* is Bermuda's most dived shipwreck because of her stately appearance and historical background. She was an English built steamer under charter to the American Confederacy. Loaded with a cargo of corn, beef and rifles, the vessel struck an inshore reef by error and sank in the year 1864. She now rests on a sandy bottom near that very same reef. Her giant steam boilers and paddlewheels are still in evidence, and she is the only paddlewheeler wreck in existence with one of her paddlewheels still standing upright. It looks much like a miniature Ferris wheel from a children's amusement park. The *Mary* has been declared a

(Continued on Page 65)

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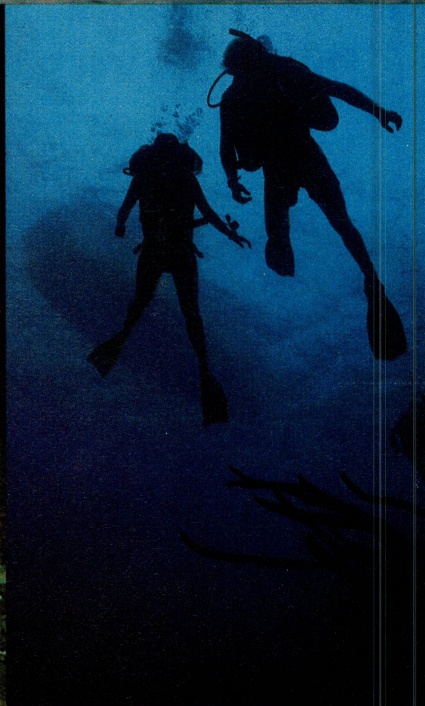
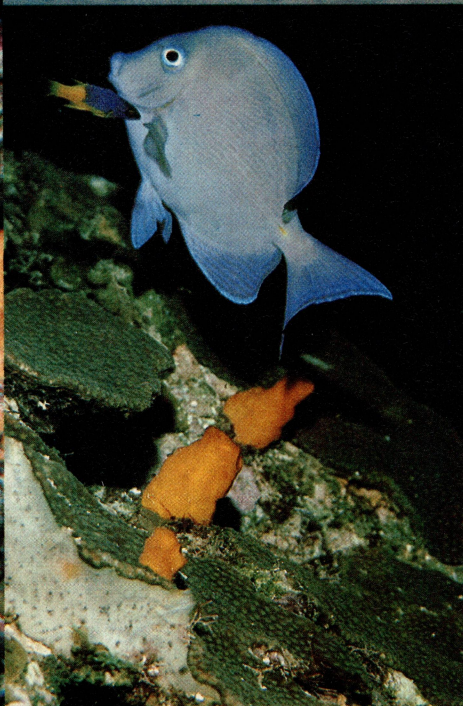
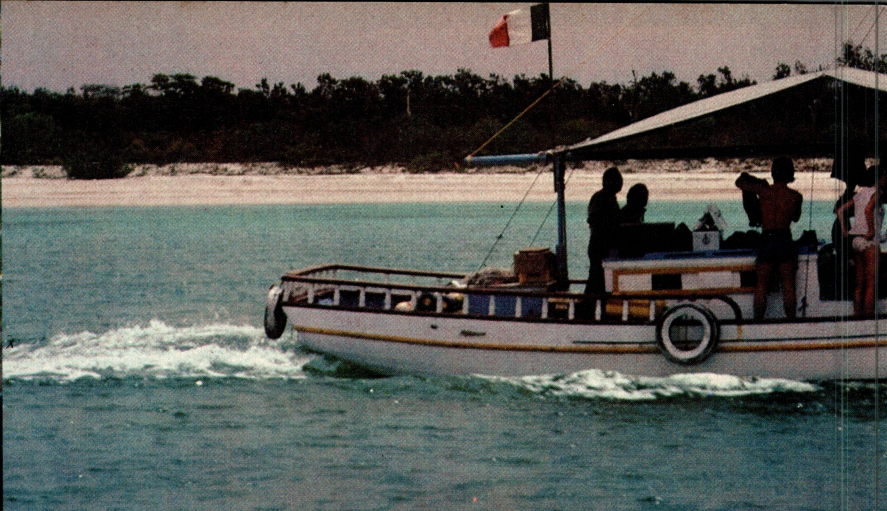
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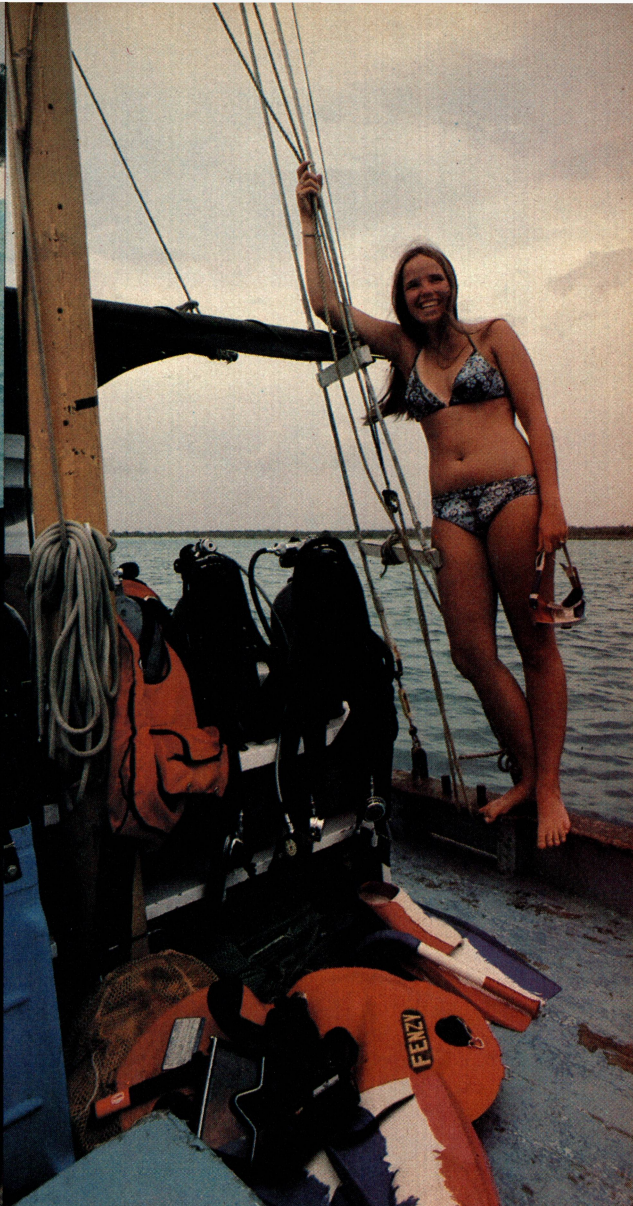
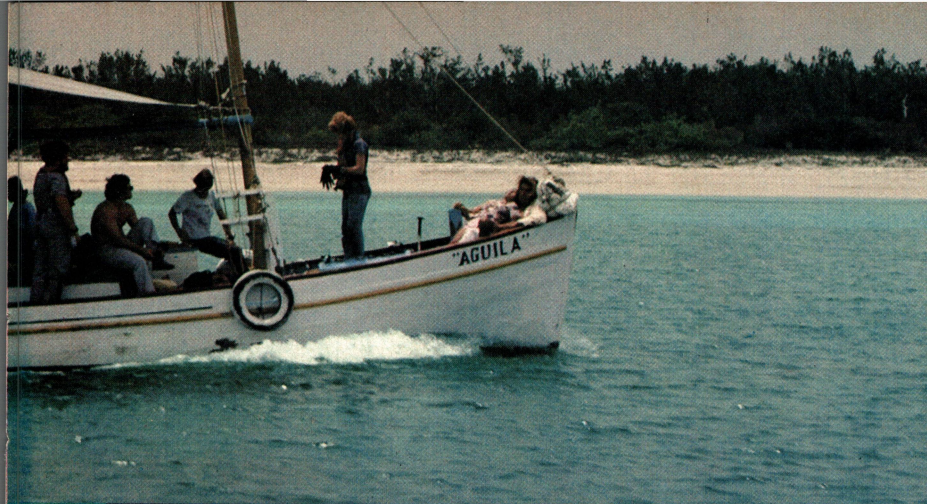
cozumel

Six years ago on my first visit to the island of Cozumel I was snorkeling over to the boat late in the day on my very last dive on Palancar reef when a school of 15 to 20 curious porpoise came bounding in, swam close in front of me, gave me the once over, then sped off. It highlighted an already fantastic week of diving that I had had and I then vowed to one day come back to beautiful Palancar.

My vow was about to become a reality as the Mexicana 727 touched down on the smooth runway. With me was my 15 year old daughter, Kim, accompanying me as an underwater model; and traveling with us was Dave Brock, president of Go Diving. Go Diving is a diver oriented travel agency located in Minneapolis. Dave had proved a congenial companion on the first leg of a two week trip to San Andreas, Colombia, and his experience and expertise in the travel business smoothed the way for some comfortable traveling and diving.

We told Kim about the wonders of this magnificent coral

structure called Palancar, which could aptly be described as one of the seven wonders of the underwater world, and she was anxious to dive it for the first time as Dave and I were anxious to repeat the experience. Palancar is located about half a mile out from the island at the extreme southwestern tip, runs directly north and south and is washed by the Yucatan current that wells up out of a deep Caribbean gorge, bringing with it reef building food and oxygen. Physically, Palancar can be described as a miniature barrier reef. It's only six miles long, but its sheer vertical height puts it in a class by itself as perhaps the world's highest barrier reef. Situated at the edge of a gently sloping 45° decline beginning in 25 feet of water, the huge coral buttresses canyon out and down the slope horizontally for 100 yards, and vertically for 140 feet. Individual coral mounds reach fantastic heights of 60 to 80 feet. In some sections of the reef it's possible to stand on top of the coral, step off and drop 90 feet straight down to the sandy slope.



photography by Author

for '76

by Jack McKenney

Tremendous light filtering grottoes meander down through these gargantuan coral caverns connected only by a carpet of white sugar sand reflecting the blue luminosity of the sea.

As I stepped off the plane, I was in for some pleasant surprises in the changes that had taken place on this popular Caribbean island. As I expected a few new hotels had sprung up, but the most impressive change was the brand new modern airport the Mexicans had built. No longer did the jet land on an ill repaired runway and the passengers disembark to a little grass shack. The modern new facility is spacious, cool, and very colorful, and customs officials are pleasant and move everyone through with a minimum of wasted time.

Secondly, all of the fishing boats — most of them colorful motor sailers — have organized in the last couple of years into a co-op, which means that regardless of whether or not a diver travels to Cozumel alone, it will be possible to have transportation out to Palancar reef without having to dicker and end up

paying for the entire boat because there is no one else signed up. The boats run according to whose turn it is and as one boat fills up, another will be brought into service. This assures every diver of being able to visit mighty Palancar and not just be deposited on some other small, obscure reef closer to town. Trips can be arranged by calling a dive shop from your hotel.

There are three main dive shops on Cozumel: Dive Cozumel is owned and operated by Ernesto Kentzler who is opening a satellite shop further north along the island at the Cantarell hotel; Aventuras Tropical is operated by Julio Blanco; and Dick Thompkins, Ramon Zapata N., and Juan Marrufo A. run Aqua-Safari, S.A. Between these shops there are a total of close to 350 scuba tanks, 80 regulators and numerous weight belts and sets of basics for rent. Equipment can be rented directly from the dive shops or through outlets at most of the hotels. Some hotels have their own diving gear and compressors, and Cabanas del Caribe, where See and Sea Tours are run, have



When Mexicana's 727's land at Cozumel, they land on a new runway at the newly built airport. The modern, new facility is a pleasant beginning to an exciting scuba diving trip.

about another 150 tanks. Prices for a boat trip to Palancar reef including two tanks, a back pack and weight belt run between \$18 and \$20. Regulators and other accessories are extra. The boats leave the town dock or make stops at the hotels close to town between 9 — 9:15 a.m. It takes about an hour to sail down to El Presidente Hotel where we were staying, so a leisurely departure is made around 10 in the morning. From El Presidente, it's about one hour to Palancar reef.

Unfortunately, this visit to Cozumel was to only last for four days, and I was anxious to explore and discover other sections of Cozumel reefs that I didn't see on my first trip. On our first diving day, we made the first descent on Palancar. It was as magnificent as I had remembered it, but as mighty and spectacular as this popular reef is, Kim, Dave, and I discovered on our second dive, that for us, diving nearby Santa Rosa reef is where it really is at!

Santa Rosa takes up where the north end of Palancar lets off and because of the current, it is strictly a drift dive. We entered the water, swam quickly to the bottom 50 feet down, and let ourselves literally fly along in a three to four knot underwater breeze. It's extremely difficult to settle on the bottom unless one ducks behind a mound of coral wall which shelters the diver from this fast moving current. Great ramparts of coral formations jut up from a white sandy bottom, many of them undercut, projecting huge overhangs of coral that are adorned with azure vase sponges, tube sponges, even a variety of green velvet-like sponge and many more fish that we saw on Palancar. Queen angelfish were swimming in schools of four and five, grays and French angelfish would be seen on every dive and once Dave and I came upon a great sting ray four to five feet across lying on the sandy bottom just at the end of the dive. The remaining diving days were spent at Santa Rosa reef, the entire length of which can easily be traversed in a 30 to 40 minute drift dive.

Still one of the most enjoyable aspects of diving Palancar or Santa Rosa is the incredible visibility. Easily, it reaches 200 feet before falling off into a blue haze. To look back at a half dozen divers stretched out a couple hundred feet drifting along the face of Santa Rosa reef is an awe inspiring feeling. Dipping to 150 feet, we found lush black coral beds signifying that unlike parts of Palancar, which have been stripped clean of this semi-precious coral, Santa Rosa has remained virtually untouched. And over the last couple of years, black coral harvesting has been greatly frowned on in Cozumel.

Go Diving runs two packaged diving tours, each eight day, seven night trips featuring six days of diving. The economy trip which headquarters at the Barracuda Hotel close to town sells for \$229 double occupancy, European Plan. For non-divers, it is \$179. Air fare is extra on all excursions. This includes two

tanks of air per day, the boat ride down to the reef, lunch on the boat, back pack and weight belt, transportation to and from the airport, tips for luggage, and a Robinson Crusoe picnic on the beach featuring conch, lobster, and fish. Their luxury trip which sells for \$389 double occupancy, modified American Plan (two meals a day), headquarters out of the luxurious El Presidente Hotel, furthest south on the island and the closest to Palancar and Santa Rosa reef. For non-divers, the package is \$349 and features a day at the ruins of Tulum. The hotel is spread over a palm studded beach and has an interesting little reef 50 feet off shore. The rooms are large and airy and feature air conditioning, a well stocked refrigerator of soft drinks and liquor, and a private little sun patio. There is also a large entry way and another enclosed patio off the bathroom area. The dinner menus featured such epicurean delights as venison, ham and pineapple, steak, and filet of sole almandine. If one can afford it, the extra \$160 to stay at the El Presidente is well worth the experience. For more information on Go Diving tours, write to Dave Brock at: 715 Florida Ave. S., Minneapolis, Minnesota 55426.

Mexicana Airlines has rapidly escalated into a position of comfort and service that will compare to any of the large international or U. S. carriers. Flying from Miami direct to Cozumel, Kim commented that our meal of chicken was the best she's had on any airline. And I had to agree — it was excellent! Mexicana only flies non-stop from Miami to Cozumel, but connections can be made in Mexico City via Mexicana flying in from Denver, Kansas City, Dallas/Ft. Worth, St. Louis, and Chicago. Inquiries on flights, and colorful brochures can be acquired by writing directly to Mexicana Airlines, 510 W. 6th St., Los Angeles, Ca. 90014.

Montezuma still lurks around in the shadows down in Cozumel striking revenge on careless tourists who drink from the local water supply. Consequently, it's a good idea to get a prescription from your doctor before heading south. Lomotil is a popular drug often prescribed by doctors and helps to prevent diarrhea. The reason people sometimes get this upsetting sickness is as follows: Everybody has bacteria in their lower intestinal tract from what they eat and drink, and one of these bacteria happens to be *Escherichia coli*. *E. coli* is of the same strain in North Americans and some Europeans, so wherever one travels in these countries, generally they won't get sick. However, in many southern latitudes, including Mexico, parts of Central and South America, *E. coli* is of a different strain and when certain foods and water is ingested, *E. coli* produces a toxin that starts playing havoc in your stomach. If a person were to stay in Mexico long enough, he would eventually adapt to this different strain, but then when he goes back to North America, he would have to go through the same transi-

The Gildy, the boat used by Go Diving, pulls up in front of the El Presidente to load eager divers for a day of diving.

tional period once again, until *E. coli* (Mexico) was flushed out of his system and subsequently replaced with the *E. coli* (North America).

If you do contract Montezuma's revenge, and take Lomotil, you should limit your diving to relatively shallow depths that day. Lomotil is of the same family as morphine and heroin and can cause nitrogen narcosis type symptoms. And it can be habit forming. The bottom line is drink only bottled water or soft drinks, stay away from salads and ice cubes refrigerated from local water, and eat only cooked foods or fresh fruits that can be peeled.

One really needs more than four days to experience what Cozumel is all about. Palancar and Santa Rosa are the major reasons for visiting this island, of course, but there is more. Dave, Kim, and I made a couple of exciting night dives about 200 yards down the road, north of the El Presidente by going in off the beach. The Mayan ruins of Tulum should definitely be on your itinerary. They can be reached either by small private plane or by boat. The boat excursion leaves around 10 a.m. in the morning and returns to the hotel in the early evening. There are shops in San Miguel (the only town on Cozumel) for spending your hard earned money, and a selection of good restaurants at which to dine.

Although it is estimated that 1500 divers a year are now visiting Cozumel, and that most of them are diving Palancar, you can still experience that virginal feeling, as you drift down through a gargantuan Palancar canyon, or skim along the edge of Santa Rosa reef in a drift dive, that you are the only one ever to have experienced her breathtaking delights!



Above is an aerial photo of the Hotel Barracuda, headquarters of the Go Diving economy trip. Below is Tulum, only Mayan fortress and seaport. Daily tours leave Cozumel for Tulum for sightseeing, shopping, or for a day of diving near the site of the ruins.



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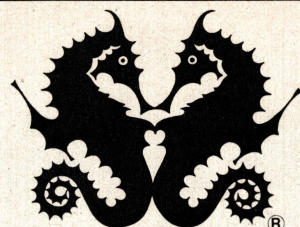
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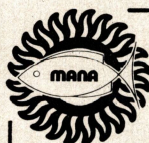
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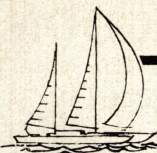
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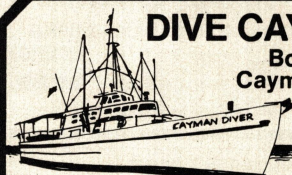
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St. Vincent, West Indies

Dive Tour News

- Jan. 3 — FLORIDA KEYS — 7 days, Berry Distributors, Inc., Alsip, IL
 Jan. 3, 12, 23 — BIMINI — 7 days, Tropic Diving Cruises, Ft. Lauderdale, FL
 Jan. 4 — GRAND CAYMAN — 10 days, Sierra Club, San Francisco, CA
 Jan. 7, 21 — MAJURO — 9 days, Micronesia Expeditions, Salt Lake City, UT
 Jan. 7, 17 — BIMINI — 7 days, Capt. LaChance, Adventure Cruises, Ft. Lauderdale, FL
 Jan. 10 — BONAIRE/CURACAO — 9 days, Lee Turcotte, Atlantis Safaris, Miami Shores, FL
 Jan. 10 — ROATAN/HONDURAS — 8 days, Anthony's Key Resort, Miami, FL
 Jan. 10 — GRAND CAYMAN — 8 days, Oceaneers Dive Tours, Inc., Hollywood, FL
 Jan. 11 — GRAND CAYMAN — 8 days, Jack's Dive Center, Plainville, CT
 Jan. 17 — COZUMEL — 8 days, Oceaneers Dive Tours, Inc., Hollywood, FL
 Jan. 17 — CAYMAN ISLANDS — 8 days, See & Sea Travel, San Francisco, CA
 Jan. 18 — RED SEA/SINAI — 10 days, International Divers Association, Chicago, IL
 Jan. 19 — KONA — 5 days, Horizons International, Seattle, WA
 Jan. 23 — FLORIDA KEYS — 3 days, Capt. Tom Guarino, Key Largo, FL
 Jan. 24 — COZUMEL — 8 days, Chris Marraud, See & Sea Travel, San Francisco, CA
 Jan. 24, 31 — SAN SALVADOR — 8 days, Oceaneers Dive Tours, Inc., Hollywood, FL
 Jan. 31 — AUSTRALIA/Great White Shark Expedition — See & Sea Travel, San Francisco, CA
 Feb. 2, 11, 21 — BIMINI — 7 days, Capt. LaChance, Adventure Cruises, Ft. Lauderdale, FL
 Feb. 4 — FLORIDA KEYS — 5 days, Berry Distributors, Inc., Alsip, IL
 Feb. 4, 18 — MAJURO — 9 days, Micronesia Expeditions, Salt Lake City, UT
 Feb. 6, 20 — FLORIDA KEYS — 3 days, Capt. Tom Guarino, Key Largo, FL
 Feb. 7 — BONAIRE/CURACAO — 9 days, See & Sea Travel, San Francisco, CA
 Feb. 7 — GRAND CAYMAN — 8 days, Oceaneers Dive Tours, Inc., Hollywood, FL
 Feb. 8 — RED SEA/SINAI — 10 days, International Divers Association, Chicago, IL
 Feb. 13 — BONAIRE — 8 days, Happy Wanderer, Bronxville, NY
 Feb. 14 — CAYMAN ISLANDS — 8 days, See & Sea Travel, San Francisco, CA
 Feb. 14 — COZUMEL — 8 days, Oceaneers Dive Tours, Inc., Hollywood, FL
 Feb. 16 — KONA — 5 days, Horizons International, Seattle, WA
 Feb. 21 — CANCUN — 8 days, Oceaneers Dive Tours, Inc., Hollywood, FL
 Feb. 21 — COZUMEL — 8 days, See & Sea Travel, San Francisco, CA
 Feb. 22 — RED SEA/SINAI — 10 days, International Divers Association, Chicago, IL
 Feb. 22 — CARTAGENA, COLOMBIA — 8 days, Sunland Int'l Tours, Beverly Hills, CA
 Feb. 22 — BAHAMAS — 7 days, Berry Distributors, Inc., Alsip, IL
 Feb. 27 — COZUMEL — 8 days, Sunland Int'l Tours, Beverly Hills, CA
 Mar. 3, 17, 31 — MAJURO — 9 days, Micronesia Expeditions, Salt Lake City, UT

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5820 Burning Tree, El Paso, Texas 79912

- Mar. 5 — BERMUDA — 8 days, Happy Wanderer, Bronxville, NY
- Mar. 6 — CANCUN — 8 days, Oceaneers Dive Tours, Inc., Hollywood, FL
- Mar. 6 — SAN SALVADOR — 8 days, Oceaneers Dive Tours, Inc., Hollywood, FL
- Mar. 6 — FLORIDA KEYS — 7 days, Berry Distributors, Inc., Alsip, IL
- Mar. 6 — BIMINI — 7 days, Capt. Skeet LaChance, Adventure Cruises, Ft. Lauderdale, FL
- Mar. 7 — RED SEA/SINAI — 10 days, International Divers Association, Chicago, IL
- Mar. 10 — GALAPAGOS — 15 days, Stan Waterman, See & Sea Travel, San Francisco, CA
- Mar. 11 — MICRONESIA — 10 days, Horizons International, Seattle, WA
- Mar. 13 — COZUMEL — 8 days, Oceaneers Dive Tours, Inc., Hollywood, FL
- Mar. 13 — GRAND CAYMAN — 8 days, Oceaneers Dive Tours, Inc., Hollywood, FL
- Mar. 13 — CAICOS ISLANDS, BWI — 8 days, Tomasi's, NMU Scuba School, Marquette, MI
- Mar. 13 — CAYMAN ISLANDS — 8 days, See & Sea Travel, San Francisco, CA
- Mar. 15 — KONA — 5 days, Horizons International, Seattle, WA
- Mar. 17 — BIMINI — 10 days, Capt. LaChance, Adventure Cruises, Ft. Lauderdale, FL
- Mar. 20 — COZUMEL — 8 days, See & Sea Travel, San Francisco, CA
- Mar. 20 — SEA OF CORTEZ — 9 days, Sunland Int'l Tours, Beverly Hills, CA
- Mar. 20 — BELIZE/BLUE HOLE — 7 days, Diver's World, Inc., Richardson, TX
- Apr. 3 — SAN SALVADOR — 8 days, Oceaneers Dive Tours, Inc., Hollywood, FL
- Apr. 4 — CARTAGENA, COLOMBIA — 8 days, Sunland Int'l Tours, Beverly Hills, CA
- Apr. 5 — RED SEA/SINAI — 10 days, International Divers Association, Chicago, IL
- Apr. 7 — FLORIDA CAVES — 5 days, Berry Distributors, Inc., Alsip, IL
- Apr. 7, 14, 20, 27 — BIMINI — 5 days, Capt. Tom Guarino, Key Largo, FL
- Apr. 9 — BONAIRE — 7 days, Scuba Tours, Fairfax, VA
- Apr. 10 — GRAND CAYMAN — 8 days, Oceaneers Dive Tours, Inc., Hollywood, FL
- Apr. 10 — CANCUN — 8 days, Oceaneers Dive Tours, Inc., Hollywood, FL
- Apr. 10 — COZUMEL — 8 days, Oceaneers Dive Tours, Inc., Hollywood, FL
- Apr. 10 — CAYMAN ISLANDS — 8 days, See & Sea Travel, San Francisco, CA
- Apr. 10, 20 — BIMINI — 7 days, Capt. LaChance, Adventure Cruises, Ft. Lauderdale, FL
- Apr. 14, 28 — MAJURO — 9 days, Micronesian Expeditions, Salt Lake City, UT
- Apr. 16 — COZUMEL — 8 days, Sunland Int'l Tours, Beverly Hills, CA
- Apr. 17 — DOMINICAN REPUBLIC — 8 days, Lee Turcotte, Atlantis Safaris, Miami Shores, FL
- Apr. 17 — COZUMEL — 8 days, See & Sea Travel, San Francisco, CA
- Apr. 19 — KONA — 5 days, Horizons International, Seattle, WA
- Apr. 24 — BONAIRE/CURACAO — 9 days, See & Sea Travel, San Francisco, CA
- Apr. 27 — TAHITI/RANGIROA — 16 days, Dewey Bergman, See & Sea, San Francisco, CA
- May 1 — SAN SALVADOR — 8 days, Oceaneers Dive Tours, Inc., Hollywood, FL
- May 1 — COZUMEL — 8 days, Oceaneers Dive Tours, Inc., Hollywood, FL
- May 1 — FLORIDA KEYS — 7 days, Berry Distributors, Inc., Alsip, IL
- May 4, 12, 19 — BIMINI — 7 days, Capt. Tom Guarino, Key Largo, FL
- May 5 — GALAPAGOS — 15 days, Jack McKenney, See & Sea Travel, San Francisco, CA
- May 6 — GALAPAGOS ISLANDS — 24 days, Sierra Club, San Francisco, CA
- May 8 — SEA OF CORTEZ — 9 days, Sunland Int'l Tours, Beverly Hills, CA
- May 8 — BIMINI — 10 days, Capt. Skeet LaChance, Adventure Cruises, Ft. Lauderdale, FL
- May 8 — AQABA, JORDAN — 15 days, See & Sea Travel, San Francisco, CA
- May 8 — CAYMAN ISLANDS — 8 days, See & Sea Travel, San Francisco, CA
- May 12, 26 — MAJURO — 9 days, Micronesian Expeditions, Salt Lake City, UT
- May 15 — COZUMEL — 8 days, See & Sea Travel, San Francisco, CA
- May 17 — RED SEA/SINAI — 10 days, International Divers Association, Chicago, IL
- May 17 — KONA — 5 days, Horizons International, Seattle, WA
- May 18 — BIMINI — 10 days, Capt. LaChance, Adventure Cruises, Ft. Lauderdale, FL
- May 22 — BONAIRE/CURACAO — 9 days, See & Sea Travel, San Francisco, CA
- May 28 — COZUMEL — 8 days, Sunland Int'l Tours, Beverly Hills, CA
- May 29 — BRITISH HONDURAS — 7 days, Berry Distributors, Inc., Alsip, IL
- May 29 — CANCUN — 8 days, Oceaneers Dive Tours, Inc., Hollywood, FL
- May 29 — GRAND CAYMAN — 8 days, Oceaneers Dive Tours, Inc., Hollywood, FL
- June 1 — TAHITI/RANGIROA — 16 days, Carl Roessler, See & Sea, San Francisco, CA
- June 1 — CAY SAL 3 days, Capt. Tom Guarino, Key Largo, FL



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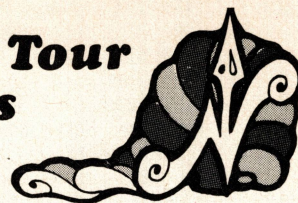


P.O. B

th
BWIA

State _____ Zip _____

Dive Tour News



June 4, 16 — GRAND CAYMAN — 12 days, Sierra Club, San Francisco, CA
June 5 — SAN SALVADOR — 8 days, Oceaneers Dive Tours, Inc., Hollywood, FL
June 5 — CAYMAN ISLANDS — 8 days, Rich Bergero, See & Sea, San Francisco, CA
June 7 — CAY SAL — 4 days, Capt. Tom Guarino, Key Largo, FL
June 7, 17, 27 — FREEPORT — 7 days, Capt. Skeet LaChance, Adv. Cruises, Ft. Lauderdale, FL
June 9, 23 — MAJURO — 9 days, Micronesian Expeditions, Salt Lake City, UT
June 9 — FLORIDA KEYS — 5 days, Berry Distributors, Inc., Alsip, IL
June 12 — CANCUN — 8 days, Oceaneers Dive Tours, Inc., Hollywood, FL
June 12 — COZUMEL — 8 days, See & Sea Travel, San Francisco, CA
June 18 — CHINCHORRO REEF — 10 days, Sunland Int'l Tours, Beverly Hills, CA
June 19 — COZUMEL — 8 days, Oceaneers Dive Tours, Inc., Hollywood, FL
June 19 — ANTHONY'S KEY, ROATAN — 8 days, Atlantis Safaris, Miami Shores, FL
June 19 — BELIZE BARRIER REEF — 14 days, Sierra Club, San Francisco, CA
June 30 — GALAPAGOS — 15 days, See & Sea Travel, San Francisco, CA
July 3 — FLORIDA KEYS — 7 days, Berry Distributors, Inc., Alsip, IL
July 3 — BRITISH HONDURAS — 7 days, Berry Distributors, Inc., Alsip, IL
July 3 — SAN SALVADOR — 8 days, Oceaneers Dive Tours, Inc., Hollywood, FL
July 3 — CANCUN — 8 days, Oceaneers Dive Tours, Inc., Hollywood, FL
July 7, 21 — MAJURO — 9 days, Micronesian Expeditions, Salt Lake City, UT
July 7 — FIJI & TONGA — 20 days, Sierra Club, San Francisco, CA
July 8 — VIRGIN ISLANDS — 12 days, Sierra Club, San Francisco, CA
July 9 — COZUMEL — 8 days, Sunland Int'l Tours, Beverly Hills, CA
July 10 — COZUMEL — 8 days, Oceaneers Dive Tours, Inc., Hollywood, FL
July 14 — BIMINI — 10 days, Capt. LaChance, Adventure Cruises, Ft. Lauderdale, FL
July 17 — ROATAN/HONDURAS — 8 days, Anthony's Key Resort, Miami, FL
July 24 — SEA OF CORTEZ — 9 days, Sunland Int'l Tours, Beverly Hills, CA
July 27 — NASSAU — 14 days, Capt. LaChance, Adventure Cruises, Ft. Lauderdale, FL
Aug. 2 — KONA COAST, HAWAII — 12 days, Sierra Club, San Francisco, CA
Aug. 4, 18 — MAJURO — 9 days, Micronesian Expeditions, Salt Lake City, UT
Aug. 7 — CANCUN — 8 days, Oceaneers Dive Tours, Inc., Hollywood, FL
Aug. 12 — LANAI & MAUI — 12 days, Sierra Club, San Francisco, CA
Aug. 14 — COZUMEL — 8 days, Oceaneers Dive Tours, Inc., Hollywood, FL
Aug. 14 — FREEPORT — 10 days, Capt. LaChance, Adventure Cruises, Ft. Lauderdale, FL
Aug. 15 — N. CALIFORNIA COAST — 7 days, Sierra Club, San Francisco, CA
Aug. 18 — FLORIDA CAVES — 5 days, Berry Distributors, Inc., Alsip, IL

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Come to the luxurious new Oceaneers Dive Center in Haiti and kiss ordinary diving vacations goodbye. Here is what's in store on the most incredible dive trip you will ever take.

Ancient ship wrecks/art galleries/authentic voodoo ritual/Bauer compressor/barbecue/beaches/black coral forests/casino gambling/coral gardens/Creole cooking/deep-sea fishing/disco dancing/dive shops/dugout canoes/eight day certification/fifty aluminum tanks/free port shopping/French cuisine/fresh water pool/giant Manta Rays/grottos/handicrafts/Hobie Cats/horseback riding/Iron Market/live band/lobsters/meringue/mountains/night dives/picnics/pirate treasure/primitive villages/rare tropical fish/rum punch/sailing/snorkeling/sculpture/Sunfish/sunken Japanese freighter/T-shirts/tennis/three dive boats/uninhabited islands/unusual shells/U.S.C.G. approved Captain/virgin reefs/water skiing/Wall of La Gonave.

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BERMUDA

(Continued from Page 54)

"public wreck" by Bermuda law and is open to anyone except commercial salvagers. Many interesting mementos have been found on this ship by sport divers, including pewter mugs, small portholes, and china.

The wreck of the *Minnie Bresslau* lies one and a half miles east of the hotel, and takes ten minutes to reach by boat. She is a large steel hull English steamer which plowed into the reefs and sank in 1873. Her twisted hull plates and steel girders lie in depths ranging from 25 to 70 feet, with the stern in deepest water. Her cargo included dried fruit, bundles of cork, and large ingots of lead weighing 150 pounds each. Many of these ingots can still be seen on the wreck, and some are salvaged from time to time. The most prominent features of the *Minnie* are the ship's wheel, a giant steam boiler, the ship's four-blade propeller, the steering quadrant, and a long driveshaft. She is an excellent wreck for photography because the visibility is consistently better here than on other south coast wrecks.



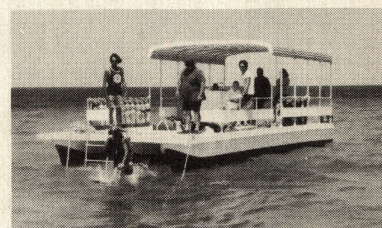
American Airlines jets make daily flights to Bermuda from most east coast cities. The flight takes less than two hours.



The propeller and rudder of the *Minnie Bresslau* found in 70 feet of water.

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A statement and offering statement has been filed with the Department of State of the State of New York. The filing does not constitute approval of the sale or lease or offer for sale or lease by the Department of State or any officer thereof or that the Department of State has in any way passed upon the merits of such offering. A copy of the offering statement is available, upon request, from the subdivider. And in addition thereto the assigned advertising number.

NYA-74-1153



The only crowded place in the British Virgin Islands is under water.

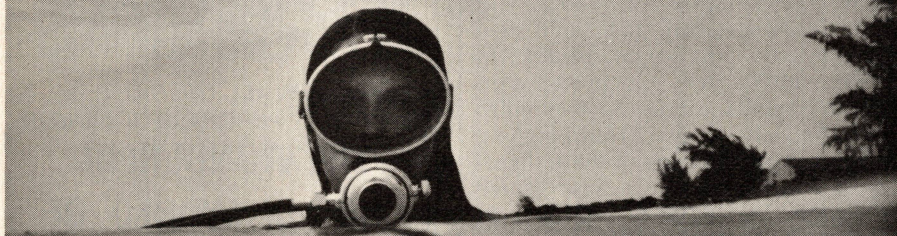
The reefs are teeming with Queen Triggerfish, Queen Angels, Rock Beauties, Sergeant Majors, Blue Tangs, and assorted wrecks.

And to make sure you don't get lost in the crowd, our Aquatic Centre is fully equipped and staffed by certified instructors for snorkeling, scuba lessons, guided tours, and underwater photography.

Aside from them, the only other person diving will probably be your buddy.

Peter Island

Peter Island Yacht Club, British Virgin Islands



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in February with
skin diver

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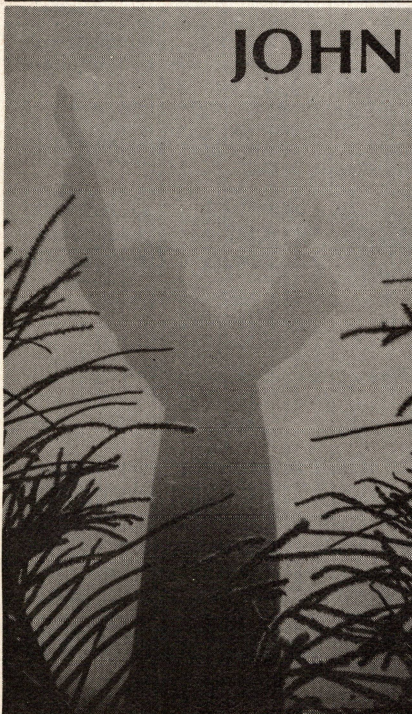
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BERMUDA

Another three miles east lies the dynamited remains of a World War I ammunition ship called the *Pollockshields*. She was also an English steamer which was driven onto the reef during a hurricane in 1915. The ship's hullplates and beams are pretty well flattened, and lie in very shallow water ranging from 10 to 20 feet. Some of the prominent features include a spare propeller lashed to the forward deck, large boilers, winches, and a driveshaft which slants



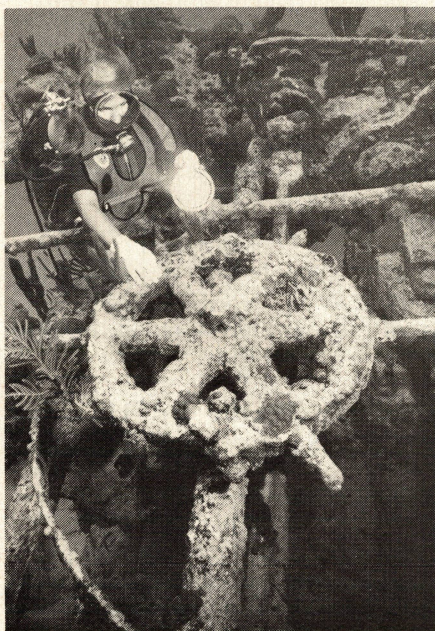
A 7-inch brass shell casing from the World War I munitions ship, *Pollockshields*.

upward toward the surface. The stern section is the only part of the ship still intact, and this is where you can still find some of the ammo cargo. There are seven-inch, three-inch, and two-inch brass shell casings, 12-inch warheads, land mines, machine gun ammo, small caliber cannon shells, and a half-dozen other types of ammunition. It's a great wreck for goodie hunting, but divers must be careful about the ammo, as some of it may still be capable of exploding.

These are but a few of the shipwrecks found along the south coast, all within convenient reach of the dive shop. Most boat trips last about one and a half to two hours, leaving hotel guests plenty of time to do other things. For example, a trip to the Aquarium to view Teddy Tucker's golden treasure is an experience not to be missed by any diver.

To make things even more enticing, Charles Popper, manager of the Sonesta Beach Hotel, has put together a special Scuba Bermuda off season package for

divers. For \$182 total, a visiting diver gets five days and four nights stay at the Sonesta Beach Hotel, breakfast and dinner daily, seven dives with Sea Safaris, air refills, tanks, weight belt, and whatever other dive gear needed. The only other costs are things like your air fare, whatever you care to have for lunch, and whatever entertainment you decide to do after diving. This special price offering will run from December '75 to March 14, 1976. For more information write to



The encrusted ship's wheel from the bridge of the Minnie Bresslau.

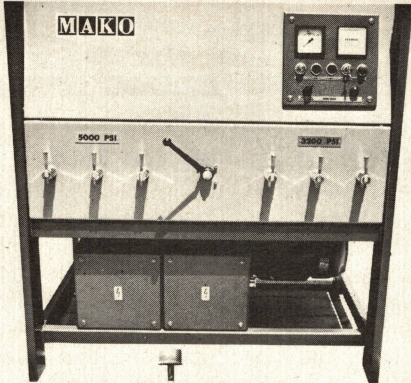
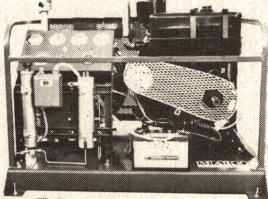
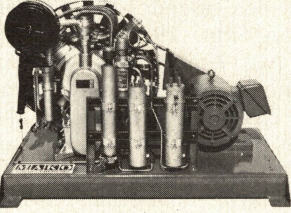
Charles Popper, Sonesta Beach Hotel, Southampton, Bermuda; or call their toll free number: (800) 225-1372.

Incidentally, getting to Bermuda is easier than you might think. Many major airlines offer daily jet service from New York, Newark, Boston, Philadelphia, Washington, and other east coast cities. Most flights are scheduled to provide maximum time on the island. For example, American Airlines flight #543 departs Kennedy International at 10:20 a.m., providing most of the afternoon for arrival and getting settled in your hotel. AA's return flight #542 doesn't depart Bermuda until 3 p.m., thus allowing time for an early morning dive on a shallow wreck. Air fares are relatively low in cost, with round trips from most eastern gateways ranging from \$122 to \$136 for mid-week excursions.

Whether you are a devout wreck enthusiast or a neophyte who has dreamed of exploring a sunken ship, you'll find Bermuda much to your liking. 

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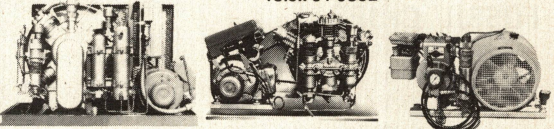
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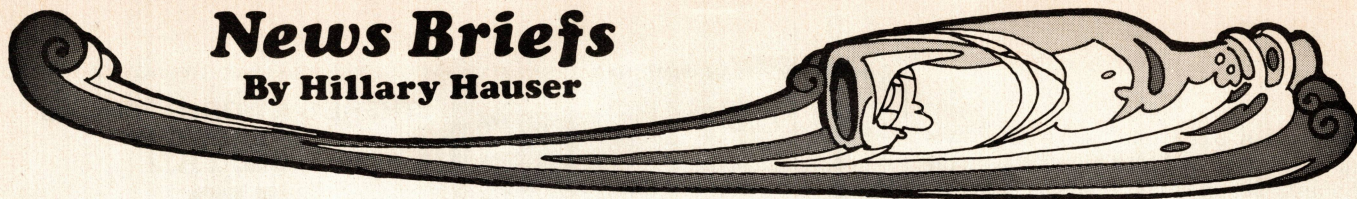
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News Briefs

By Hillary Hauser



ICE ACCIDENT

In October a graduate student of oceanography was killed in Antarctica when a tracked vehicle he was driving crashed through the ice and sank in 1640 feet of water. The student, Jeffrey Rude, 26, was a Caltech graduate working for his doctorate at Scripps when the accident took place. Rude was on an expedition studying Antarctic sea floor life at McMurdo Sound, Ross Island. Three other men on the vehicle jumped clear and escaped unhurt.

FOSSIL CHIPS

Last summer a variety of fossil algae was found on the reefs of Belize, British Honduras. Geologists using the submersible *Nekton* found the algae at 800 feet. The algae, which looks like giant potato chips, was buried in lime sand and mud that had hardened by sea water into limestone. The fossils formed porous rock reservoirs that have frequently proven to be oil-bearing. On the surface, scientists found the calcareous algae to have similar form and internal structure as those found in 200-300 million year old limestone beds on land.

NOT HERE, YA DON'T

Plans for a shark conference at Daytona Beach, Fla., recently went kerplop when city officials decided they didn't want the publicity. The Sharks in Perspective conference sponsors were told to go to a more neutral site, "like Panama." Recent publicity about shark attacks in the area was cited as the reason for the unwelcome mat, and according to Sam Dunn, president of the Daytona Beach Chamber of Commerce, "it wasn't in the best interest of the community to blow this thing any more out of proportion."

DISASTER HITS HELGOLAND

The September *Helgoland* project we told you about (NB, Nov.) sadly met with tragedy. German diver Joachim Wendler, 36, died of an air embolism, apparently incurred as he ascended the 104 feet from the *Helgoland* habitat to the surface on September 25. According to *Ocean Science News*, Wendler was pulled from the water and one and one-half hours later he was in a recompression chamber at Rockport, Maine. During the trip to the chamber at the *Helgoland* dive headquarters, he was given oxygen, mouth to mouth resuscitation and external heart massage.

Helgoland is a German habitat that was moored at 100 feet at the bottom of the Gulf of Maine, 8.5 miles off Rockport, for use in a saturation diving fishery study. Wendler and two other employees of the German firm GKSS, which operates the habitat, had gone into *Helgoland* on Sept. 19. Three days later they were joined by two American divers and they all breathed a "normoxic" mixture of oxygen and nitrogen (used also in SCORE). On Sept. 22, the divers all began decompression, not long after the arrival of the Americans. On Sept. 24 they reached one atmosphere and waited until daylight, Sept. 25, to swim to the surface. When Wendler reached the surface he clung to a buoy, waving for help. Although Wendler was recompressed to 165 feet upon entering the Rockport chamber, the treatment for embolism requires immediate recompression to that depth. Thus, NOAA officials ruled that a chamber be available aboard the boat on the surface during all diving operations, but added that the habitat system itself had nothing to do with Wendler's death.

THE QUEEN IS SICK

It looks as if the Queen Mary may not survive as a tourist center. A. N. (Sandy) Kemp, associate director of the Museum of the Sea, says that the present operating conditions, if continued, will sink the museum and the whole ship as an attraction. Tour attendance to the ship has declined steadily for the last three years and was off 12.7% last summer. Meanwhile, Knott's Berry Farm was up 52%, Magic Mountain 10%, Marineland 30%, and Disneyland approximately 7%. Kemp cited lack of advertising and the fact that tourists can board the ship free without touring the museum. The commercial businesses, on the other hand, which includes 50 restaurants, shops and concessions, encourage the free boarding, since they feel it attracts customers. The Museum of the Sea still owes the Bank of America \$1.4 million of a \$4 million loan used for the original development and the loan was supposed to have been retired last July. The Museum also owes the city of Long Beach \$1.5 million in utility charges, security, maintenance and insurance. The staff has been cut to the bare bone, and Kemp has told the city that the Museum simply cannot afford to pay. Long Beach city manager John R. Mansell says that the ship will stay afloat at any cost, that possibly a single operator could coordinate all the commercial interests and that plans have been formulated for restructuring the Queen Mary as a nonprofit corporation.

AGAIN, ATLANTIS

A new search for Atlantis has begun, this time by Captain Cousteau, who initiated his search in October off Greece. Cousteau's project is mainly funded by the Greek government and will involve the filming of Aegean islands seabeds. The culmination of the project will be a submarine descent into a sunken crater near the island of Thira, which many believe to be the lost city. Out of his search, Cousteau plans two films, *In Search of Atlantis*, and *Mediterranean Treasures*, which will be distributed to major television networks. (Newsclip submitted by Ellsworth Boyd.)

CLOSE-IN CACHE

Royal Navy divers have found the wreck of a Spanish galleon which they believe to be *Duque of Florencia*. The *Florencia* held the pay-chests for the armada that tried to invade England in 1588 at the orders of King Philip II of Spain. The ship was found by the divers in Tobermory Bay, on Scotland's west coast, in 80 feet of water. According to a news report we received from Ellsworth Boyd, the find was made only about 350 yards from a Tobermory pier.

PALS FOR NESSIE

A leading British naturalist believes that Nessie has friends. Sir Peter Scott has stated that if there is one monster in the waters of Scotland's Loch Ness, which is not connected to the sea, "then for zoological reasons it must have several companions." According to a Reuters press report, Scott's belief stems from underwater photographs taken by a team of English and American scientists in 1972. Boston Academy of Applied Science, team used echo sounders to trip cameras when large objects approached.

STEWED TO GILLS

What are the effects of alcohol on sunfish? The Federal government is spending \$102,000 to find out and Sen. William Proxmire (D.-Wis.) is plenty agitated. Proxmire, who is an outspoken critic of federal spending, says that the Natl. Institute on Alcohol Abuse and Alcoholism, which is conducting the research project, is only trying to determine what it meant to be "stewed to the gills." Says the senator, "It's time the government took a sober look at its research priorities and spending."

EUROPEAN FIRST

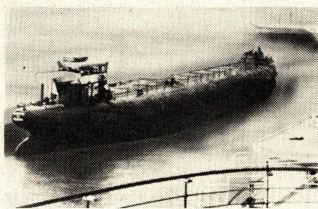
A NAUI instructor program was recently held in Europe and it has been called "a first in NAUI history." Curt Halter, director of the European Divers Association, reports that a combined IQC/ITC was successfully completed by eight candidates in Adana, Turkey. An Instructor Qualification Course (IQC) was held in Germany at the end of October. For information on other courses and European diving activities, contact Halter at the European Divers Association, P.O. Box 2812, APO (New York) 09057.

EVERYTHING YOU WANT TO KNOW . .

Just out: *The NOAA Diving Manual: Diving for Science and Technology* — which will tell you "everything you need to know to be a competent diver in water up to 300 feet deep." We heard about it through *Ocean Science News*; the manual consists of 17 major sections, including diving physiology and scientific diving procedures, a rather complete section on references (from cave diving to photography), decompression and recompression tables, lists of the underwater-habitats of the world, and dangerous marine animals. Copies are \$8.55 from the Govt. Printing Office, Washington, D.C. 20402 (stock no. 003-017-00283).

MYSTERY SHIP

A ship of uncertain origin was recently removed from a Norfolk harbor by International U/W Contractors of New York. The steel ship, measuring 260 ft. long by 36 ft. wide, is believed to be the *Bangor*, a whaleback collier originally built for the Great Lakes trade in 1893 at Superior, Wisconsin, and taken to the east coast in 1912. The *Bangor* was rammed by the motorship *Essex* on December 6, 1912, and sank, according to reports, in the middle of the channel with a load of coal. IUC divers found the holds of the wreck still loaded with coal, and broke it up with explosives in order to bring it up. All in all, IUC removed 600 tons of steel to complete their clearance contract for the U.S. Army Corps of Engineers.



The Bangor at anchor, circa 1912.

FORTUNE IN TEETH

In case you missed it, *Jaws* has outsold *The Godfather* (\$85.7 million), *The Sound of Music* (\$83.9 million), *Gone With the Wind* (\$70.2 million), *The Sting* (\$68.5 million), *The Exorcist* (\$66.3 million). These figures are for film rentals, which are used to rank films. By September 21, 1975, *Jaws* had grossed \$130 million in the box office, or about \$97 million in rentals, which makes it the champ, er, champ. Our three months publishing delay means that *Jaws* is assuredly over the \$100 million mark by now. Universal obviously likes all that money because the studio is already into production on *Jaws II*. \$100 million is enough to inspire anybody. We have heard that one studio (a major one, too) was working up a picture about a pack of killer dogs, called *Paws*.

HELP FOR ABS

The decline of the California abalone population has spurred the Calif. Dept. of Fish and Game to implement a management plan for the abalone fisheries. Recommended by the department is a moratorium on issuing commercial abalone permits to new divers and the closure of a major portion of the Los Angeles-Orange County coastline to both sport and commercial abalone fishermen, in order to rebuild populations. DFG officials are also recommending limiting the sport fisherman to four abs a day as opposed to the present five, and reducing the northern Calif. season from ten months to six — April through June and Sept. through Nov. The Southern Calif. season (Yankee Pt., Monterey County, south) would continue to open March 10 and close Jan. 14, except for the northeasterly side of Catalina Island, where the dates would be April 1-Oct. 1.

That's the essence of the Department's plans. Legislative action is required for commercial regulations, and sport fishery rules require DFG Commission approval. We'll keep you posted.

DOWNSTREAM

Last summer a group of divers, support crews, industry supervisory personnel, diving instructors, chamber operators and a group of medical and paramedical personnel got together at Commercial Diving Center, Wilmington, Calif. The resulting seminar served as a sounding board for commercial diving industry leaders to establish safety standards to avoid government interference. Topics covered included diving medicine and physiology, diving and chamber safety, and treatment of diving casualties. According to CDC, the report on the seminar will be distributed widely throughout the commercial and sports diving fields, and is called *Downstream*. For information, write CDC, 272 So. Fries Ave., Wilmington, Ca. 90744.

MONTREAL DIGS

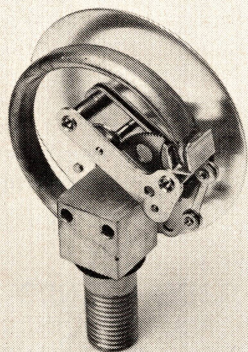
Les Archeonautes is a Canadian organization specializing in U/W research and archaeology. The Montreal group has been excavating at historical sites in the Richelieu River (Fort Lennox and Fort St. John) and at the English Point site off the north coast of the St. Lawrence Gulf where ten warships sank in 1711. President of Les Archeonautes, Andre Lepine, reports that all artifacts uncovered by his group are at the Military and Maritime Museum of Montreal, and that various museums in the area are supporting their archaeological work.

ODDS & ENDS

Press reports indicate that Jacques Mayol of France descended to 291 1/2 feet in a breathhold dive off the Island of Elba for a new world, gasp, record. . . Ron Linsky, director of USC Sea Grant program, has taken a one-year leave of absence from Los Angeles to head the Hawaii program. One of his projects will be to encourage research into the environmental impact of tourism and recreation. . . An 18-month survey of the Baltic Sea is being conducted by Denmark, Finland, Poland, Sweden, Russia and Germany, to be completed by the end of this year. . . The first sighting of a manatee in the Bahamas in 70 years has been verified by Fla. marine mammalogist Dr. Dan Odell. The sea cow was seen in a lagoon at West End, Grand Bahama, at the edge of a golf course. . . The state of Calif is again suing another lobster fisherman, this time for \$149,310. The suit alleges that Michael Lee Marquez of Santa Ana unlawfully took, possessed or killed 4931 lobsters, 4842 of which were smaller than legal size. . . A team of British divers went to 990 feet last Sept., the deepest dive ever recorded by a British diving team. They did it in a Mark I Deep Dive System, with NEDU and the Naval Coastal Systems Lab, Fla., supporting.

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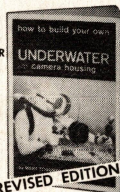
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Scientific Enterprise Associates or S.E.A Institute, Inc. is a unique research organization in its formative stages. The ultimate objectives of the institute are to provide support for various aspects of ocean related research. The organization is unique in that it is perhaps a first attempt to involve the general public in research activities. In addition to seeking support from conventional granting agencies, programs are being developed whereby private contributors will receive visitations or participation privileges involving them in current research, on location aboard the institute's research vessel *S.E.A. Quest*, a 40 ft. ferro-cement, diesel, auxiliary ketch.

During the initial stages, investigations will reflect the interest of the Institute's founder and director, Richard Johnson, and will involve shark behavioral investigations. The institute presently has a proposal pending with the Office of Naval Research to study the cause and prevention of non-feeding motivated shark attacks with emphasis on related shark social behavior. This project will involve the construction of a special pursuit and observational submersible. During the interim the institute has received the support of the government of French Polynesia and the research vessel, *S.E.A. Quest*, is currently operating off the shores of Tahiti documenting local species of sharks. Results of this research have initiated preparation of a book to be published early next year tentatively entitled *The Sharks Of Tropical Polynesia*.

S.E.A. Institute, Inc. cordially invites inquiries concerning expedition visitation or participation in on-going or future projects. Send inquiries to S.E.A. Institute, Inc., 2018 Pacific Ave., Long Beach, Calif. 90806.

NAME THE SUPERBOAT

Fifty thousand dollars in travel prizes are being offered in Pacific Sportdiving's "Name the Superboat" Contest.

Pacific Sportdiving Company currently has under construction a new 85-foot all-aluminum luxury sportdiving boat. This boat is planned from the keel-up specifically for the comfort and convenience of divers.

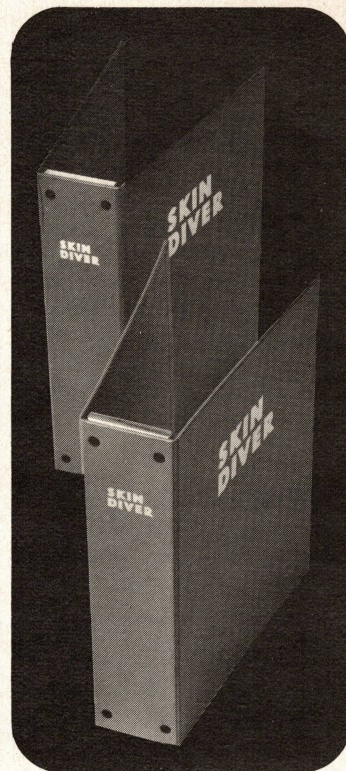
Set to go into service in July of next year, the "Superboat" will explore Hawaii's hundreds of miles of previously inaccessible coral reefs, caves, lava tubes and drop-offs during half-week, one week and two week trips.

The boat itself features comforts such as private staterooms for each party, gourmet galley, comfortable restaurant booth seating, bar, lounge, large sun-deck, air conditioning, and five fresh water showers. Divers will also appreciate the Zodiac skiffs, fast air fills, multiple exits, easy return ramp and carefully limited loads.

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Don McGrew, president of Pacific Sportdivers, says the boat "has everything but a name. We invite entries of suggested names at anytime between now and March 31st, 1976." The first person to submit the name which is finally adopted will win two free, one-week trips valued at \$1200 to be used at the winner's convenience. 999 runner-up winners will be selected to bring the total value of all prizes to be awarded to more than \$50,000. Names should be submitted to: Pacific Sportdiving Company, 4104 Anaheim Street, Long Beach, California 90804.

BUCHANAN JOINS SAS

Sub Aquatic Systems (SAS) is proud to announce the appointment of Chuck Buchanan as Vice President and Marketing Director for the company.

SAS, a company owned and directed by diving retailers, made the decision on October 4th.



Chuck is a former retailer and NASDS and YMCA diving instructor. Chuck was instrumental in the forming of NASDS in 1962. He operated Divers Corner in Downey, California, from 1966 until 1968 and was active in consultant work for diving companies (Empress, Parkway, etc.) until 1969 when he was hired by Sportsways. He took over the Sales Manager position for that company in 1971. He was president of DEMA (Diving Equipment Manufacturers Association) for two terms until his resignation October 6th.

His background in every phase of the diving industry is a great asset for SAS and for retailers this company serves.

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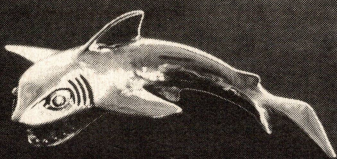
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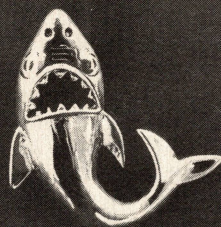
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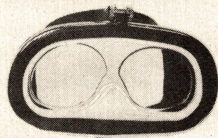
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SLATE DIRECTS PADI COLLEGE



John B. Slate has been appointed as
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Jacksonville, Florida. Slate is a Master
PADI Instructor and has been an active
Underwater Educator for the past 13
years. PADI College is the only training
facility of its type located on the East
Coast. Besides directing PADI Open
Water Concept, scuba training at PADI
College offers opportunities for in-
terested individuals to do course work in
such areas as sports diving, equipment
repair. Underwater Educator is offered
with emphasis on such areas as ad-
vanced first aid, lifesaving, cardiopul-
monary resuscitation, water safety, and
dive shop business management.

Slate attended Manatee Junior College
with a major in business administration,
after which he spent five years in com-
mercial banking as a loan officer and
department manager. For the past 12
years, Slate has been directly involved in
teaching water and scuba related ac-
tivities for such organizations and institu-
tions as Manatee Junior College, Man-
atee High School, New College Sarasota,
Southeast High School, Holy Names
Girls College, Tackle Box Sarasota,
Robby Sporting Center, Suncoast Divers
Tampa, and Tackle Shack St. Petersburg.

Slate also holds an instructor rating for
the American Red Cross and is a CPR
instructor trainer for American Heart As-
sociation. He is also a graduate of Dunn
and Bradstreet School of Credit and Fi-
nancial Analysis and will be teaching the
business aspects courses and Underwa-
ter Photography program at PADI.

GENERAL WHALE

General Whale is a sharply organized
effort to accumulate all the knowledge
available on appearance of cetaceans,
the scientific name aptly applied to the
groups of wholly aquatic mammals that
are warm blooded and, like the rest of us,
suckle their young. They are the whales,
dolphins and porpoises, a very interest-
ing ramification of the evolutionary op-
portunity offered by our friends.



Man, of course, is another interesting ramification. It has been traditional for man to enjoy the whale mainly through its oil. So intense is the enjoyment of the animal's oil that man has gone to considerable inconvenience to gather all of it from the seas, the end of the effort only recently coming clearly into view, as the whales subside. It was not until the 1930's, when dolphins were first kept successfully in captivity that cetaceans were seen to be intelligent, cooperative, and beautiful, as well as oily. Today men are swimming with the great whales in the sea and making similar observations. The great whales, like their dolphin cousins, are curious, gentle, intelligent and, as the work of General Whale hopes to demonstrate, beautiful.

If we had millions of dollars we could save the whales tomorrow — no, today. But we don't. So General Whale is asking that we communicate our feelings as inexpensively as possible. They are asking their members and potential members to write a letter or two, and get their friends to do the same.

Simply say that you are avoiding products from Russia and Japan, and asking your friends to do the same, until it can be established that these great but little known giants of the sea should in fact be jerked out of the oceans at the rate of one every 14 minutes.

The names and their respective addresses of the people to write to are as follows:

His Excellency Anatoly Dobrynin, Embassy of the USSR, 1125 Sixteenth St., NW, Washington, D.C. 20036.

His Excellency Takeshi Yasukawa, Japanese Embassy, 2520 Massachusetts Ave., NW, Washington, D.C. 20008.

UN Mission: USSR, 136 E. 67th St., New York, N.Y. 10020.

UN Mission: Japan, 866 U.N. Plaza, New York, N.Y. 10016.

American tuna fisheries are killing up to 400,000 dolphins each year. They net tuna and dolphins (which travel together) all at the same time, keeping the tuna, and throwing the dolphins away.

Names and their respective addresses to write to concerning dolphins are:

Joseph R. Blum, Marine Mammal Coordinator, National Marine Fisheries Services, Dept. of Commerce, Washington, D.C. 20235.

August Felando, American Tunaboat Association, 1 Tuna Lane, San Diego, California 92101.

For further information concerning membership to this organization, write to General Whale, 9616 MacArthur Boulevard, Oakland, Ca. 94605.



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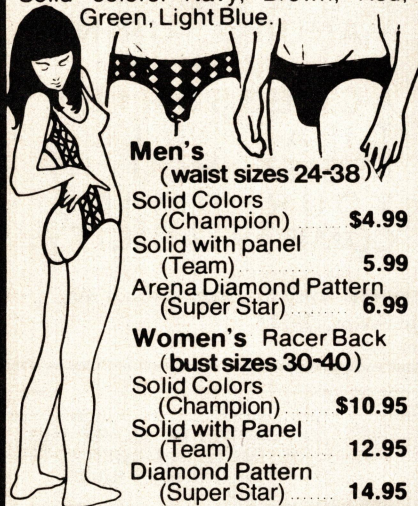
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McNEELY JOINS CREATIVE COLOR, INC.

Creative Color Inc., a small specialized custom color lab that does work for leading professional photographers, announces the association of Burton McNeely, internationally known underwater photographer, with their business. McNeely is making the same custom printing and duping services that have earned Creative Color a reputation for high quality in the professional trade available to the concerned underwater photographers everywhere. This is going to be done both by direct mail and through selected dive shops that cater to the serious underwater photographer.

For the photographer who is interested in displaying his work or entering underwater photo competitions, Creative Color offers a custom 4x5 internegative from 35mm and 2 1/4 x 2 1/2 transparencies for \$5.50. These contrast controlled internegatives allow exhibition quality color prints up to 30x40" to be made. Another service that will be of interest to anyone wishing to sell their work in the stock photo market will be the 4x5 reproduction dupes from 35mm and 2 1/4 x 2 1/4 transparencies. McNeely and other photographers who are active in the stock photo field use this technique to increase their sales and to protect valuable originals. The enlarged 4x5 dupe is offered to the prospective buyers, and the larger transparency size has a much higher acceptance rate than the smaller originals in many areas of the country. A 4x5 enlarged dupe can be made from the average transparency for \$6.60 each.



Photo-plaques from Creative Color.

Photo-plaques, a popular decorator item and very effective way of hanging underwater and marine scenes, are offered as a different way to use photos. These are exhibition quality color prints, pressure bonded to rough cut simulated wood plaques that look like old ship's timbers. They make great gift items and a couple of photographers have been selling their color prints mounted this way to seafood restaurants for decor. As an introductory offer to readers of SKIN DIVER, Creative Color will make their Photo-Plaques available until March 1 at

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U/W PHOTO DISPLAY

BY JUDY LANG



photograph by Jack Stewart

The world beneath the sea has long been an inspiration for the underwater photographer. The Northern California Chapter of the Underwater Photographic Society in conjunction with the Oakland Museum, has presented to the general public by means of outstanding underwater photography the great beauty and many life forms beneath the sea. These pictorial presentations have come about by dedicated members of NorCal U.P.S. working closely with the staff of the Oakland Museum. Over the past three years they have presented shows with themes such as: Mammals of the Sea; The Ubiquitous Sea Anemone; Fish of the Sea; and recently Marine Invertebrates. The Marine Invertebrate display had a total of 52 prints, many of which have been prize winners in various national underwater photographic competitions.

Visitors to the Oakland Museum thronged to the Natural Sciences Special Gallery to see what was billed as "Underwater photographs illustrating the diversity of forms of marine invertebrates". These non-divers were fascinated by the multitude of shapes and colors found in the different life forms from the minute protozoan to the giant medusae.

The consensus of all U.P.S. members is that of a great feeling of accomplishment upon seeing their prints on exhibit in the museum. In this, the Northern California Chapter has found one way to show their photographs to the world, and share them with those who will never go into the underwater world, but will see it only through your eyes and that of your camera lens. If you have underwater photographs just sitting in the closet at home, this is one way to share them in your community. The Northern California Chapter of the Underwater Photographic Society is now meeting at Steinhart Aquarium located in Golden Gate Park, San Francisco, on the first Friday of each month at 8:00 p.m. An "open invitation" to all visitors is always extended.

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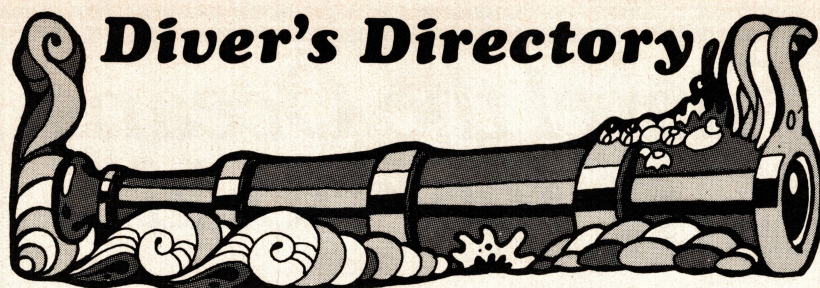


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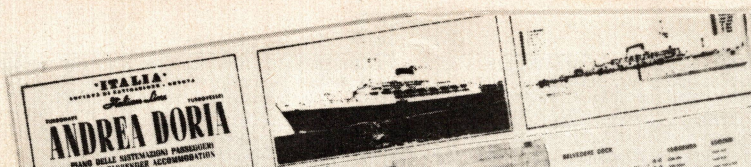
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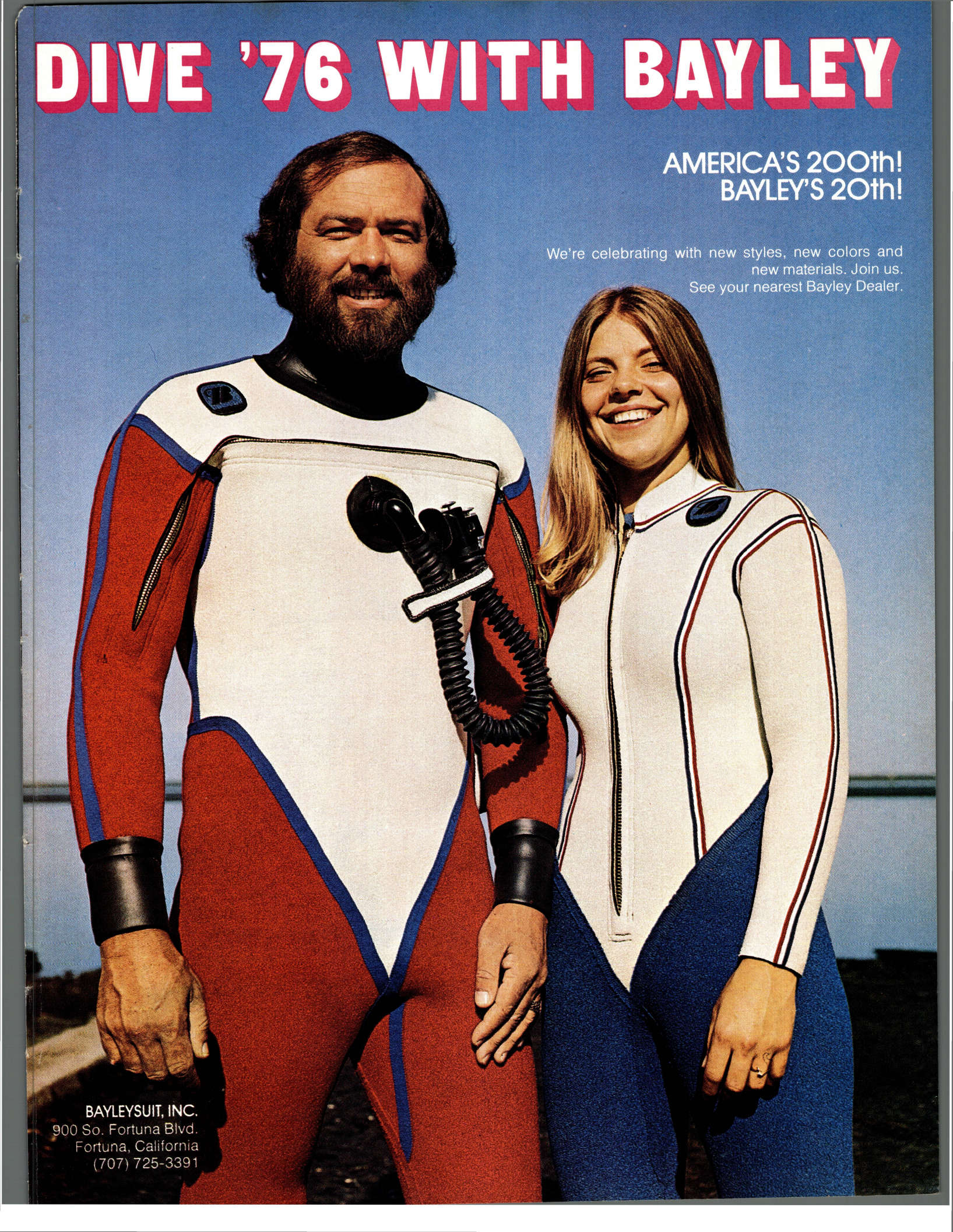
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